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CATALOGUE

OF THE

INDIAN DECAPOD CRUSTACEA

IN THE

COLLECTION

OF THE

INDIAN MUSEUM.

PART III. MACRURA.

FASCICULUS I. THE PRAWNS OF THE PENEUS GROUP.

BY

A. ALCOCK, M.B., LL.D., C.I.E., F.R.S.

LIEUTENANT-COLONEL, INDIAN MEDICAL SERVICE; CORRESPONDING MEMBER OF THE ZOOLOGICAL SOCIETY; HONORARY MEMBER OF THE NETHERLAND ZOOLOGICAL SOCIETY, AND OF THE CALIFORNIAN ACADEMY OF SCIENCES; SUPERINTENDENT OF THE INDIAN MUSEUM; AND PROFESSOR OF ZOOLOGY AND COMPARATIVE ANATOMY IN THE MEDICAL COLLEGE, CALCUTTA.

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I. INTRODUCTION.

This publication is the Third, but an independent, Part of a monograph of the Decapod Crustacea of that portion of the Oriental Region which lies within the political boundaries of British India: it treats only of the prawns of the maniple *Peneus*.

The group, of which *Peneus monodon* Fabricius is the type, forms with the genera *Solenocera* Lucas, *Parasolenocera* Wood-Mason, *Peneopsis* A. Milne Edwards, *Philonicus* Spence Bate, *Haliporus* Spence Bate (=*Hymenopeneus* S. I. Smith), *Artemisia* Spence Bate, and perhaps also *Funchalia* Johnson, a sub-family of the *Peneidæ*.

This sub-family (*Peneinæ*) is distinguished from the two other sub-families (*Aristeinæ* and *Sicyoninæ*) which constitute with it the family *Peneidæ*, by possessing, on the inner side of the basal joint of the antennular peduncle, a *large*, twisted, setose plate that forms a sort of protection, on the inner side, to the eye.

Peneus differs from all the other genera of its sub-family (1) in having only one gill-plume (arthrobranch) on the epimeral articulation of the penultimate thoracic leg, and (2) in not having the cervical groove continued as a distinct impression right across the dorsum of the carapace.

For a statement of the views here adopted as to the relations of the family *Peneidæ* to the other families and sections of the suborder Macrura, I would refer to pp. 8-11 of my *Catalogue of Indian Deep Sea Crustacea Decapoda Macrura and Anomala in the Indian Museum*, and also to the tabular statement on p. 15 of the first fascicle of the first part of this Catalogue, published in 1901.

The prawns of the Peneus group are found in the greatest abundance and variety in the Indo-Pacific, from the Red Sea and east coast of Africa (as far as 33° S.) to Japan and Australia. Eastwards of this centre they send offshoots (4 or 6 species) to the shores of California and Panama, and westwards they occur in the Mediterranean (4 species) and its Atlantic gate (one of the Mediterranean species occasionally straggling into British waters), and all along the Atlantic coasts of America from New England to Brazil (9 or 10 species), one species ranging perhaps as far south as the northern end of Patagonia.

The Penei are particularly fond of warm shallow seas, and in Indian limits they swarm, both in their larval and in their adult stages, in muddy waters

such as those into which the numerous deltas of the Bay of Bengal discharge. Some of the smaller and harder-shelled species, however, like *Metapeneus stridulans* and *mogiensis* and *Trachypeneus asper*, are often found in clear water on a bottom of coral-shingle, dead shells, etc.; while a few thin-shelled species, such as *Metapeneus coniger* and several of the species of *Parapeneus*, belong to the necton, and are only taken in deep water.

Like most other Malacostraca the Penei are scavengers; but many are carnivorous in a better sense, and several species prey upon marine larvæ and microscopic algæ.

As a rule the female is larger than the male and has a longer rostrum, the latter being a persistent juvenile character. On the other hand, the male not seldom differs from the female, either in the form of the terminal joints of the third maxillipeds, or in the sculpture of the basal joints of the last pair of thoracic legs.

Penei, both as larvæ and as adults, form the food of many fishes. Beyond this, they in themselves constitute a not inconsiderable part of that plenteous harvest of the sea which in this country still runs to waste for want of capital and enterprise. What the prawn-fisheries of India might be worth it is difficult to say; but a statement published by Kishinouye, in the Journal of the Fisheries Bureau of Tokyo for the year 1900, that the dried prawns annually exported from Japan into China are valued at 200,000 yen (or a little over £20,000), shows that there must be possibilities in them.

In conclusion, a word may be said upon the subject of "genus and species-making."

In splitting the group into GENERA, scrutiny has been directed to the following points:—

(1) The fissures and sutures of the carapace:

(2) The rostrum: whether serrated dorsally and ventrally, or only dorsally:

(3) The endopodite of the maxillules: whether segmented or not:

(4) The presence or absence of exopodites on the thoracic legs:

(5) The number and distribution of the epipodites and branchiæ.

As regards SPECIES, characters founded on the length and dorsal armature of the rostrum tend to mislead; for not only is this part of the body variable in itself and liable to malformation, but it also often exhibits sexual differences, and changes its proportions during growth, in the same species.

On the other hand, the details of sculpture of the carapace are specifically constant, irrespective of sex and age; and the relative length of the sixth abdominal somite, and the relative length of the telson and the state of its

edges—as to whether they are smooth or are spiny—are also fairly to be depended upon.

Good specific characters (with the qualifications noted against each) are furnished by the following parts:—

(1) The antennular flagella: but in the male they are sometimes longer than they are in the female, and occasionally (*e.g.*, in the adult male of *Metapeneus coniger* and *Parapeneus rectacutus*) are specially modified:

(2) The external (3rd) maxillipeds, as regards their length and the form and manner of articulation of their dactylus: but the length is often different in the two sexes and young of the same species, and occasionally (*e.g.*, several species of *Peneus* proper) the dactylus of the male is quite unlike that of the female, both in form and in mode of articulation:

(3) The chelipeds, as regards their length, and specially as regards the spines of their basal joints: in some species, however, (*e.g.*, *Metapeneus Dobsoni* and *M. Joyneri*) the spine of the basis of the 3rd pair of chelipeds is peculiarly modified in the male:

(4) The fourth pair of legs, as regards their length and the form of their merus: but the merus occasionally exhibits sexual differences:

(5) The fifth pair of legs, as regards their length, the sculpture of their merus, and the presence or absence of an exopodite: but the length sometimes changes with age and differs with sex, and the form of the merus (*e.g.*, in several species of *Metapeneus*) is sometimes quite peculiar in the male: again, in the female of *Metapeneus Dobsoni*, this pair of legs is usually represented only by a coxa and stump:

(6) The form of the andricum, or petasma, and thelycum: but only when dealing with adults.

II. SYSTEMATIC PART.

Suborder MACRURA, Dana:[1]

Section MACRURA CARIDIDES, DeHaan:[2]

Subsection PENEIDEA, Spence Bate:[3]

Family PENEIDÆ, Spence Bate:[4]

Subfamily PENEINÆ:[5]

PENEUS, Fabr.

Penæus, Fabricius, Entomol. Syst. Suppl., 1798, p. 408: Latreille, Hist. Nat. Crust. VI. 1803, p. 246: Leach, Trans. Linn. Soc. XI. 1815, pp. 336, 347, and Malacost. Podophth. Brit. text of pl. xlii: Desmarest, Consid. Gén. Crust., 1825, p. 224: Milne Edwards, Hist. Nat. Crust. II. 1837, p. 411: DeHaan, Faun. Japon., Crust., 1849, p. 188: Dana, U.S. Expl. Exp. Crust., pt. I., 1852, p. 601: Bell, Brit. Stalk-eyed Crust., 1853, p. 317: Heller, Crust. Südl. Europ., 1863, p. 292: Miers, P.Z.S. 1878, p. 298: Boas, Stud. ov. Decapod., Vid. Selsk. Skr., 6 Række, Nat. o. Math. Afd. 1.2, 1880, p. 165: Spence Bate, Ann. Mag. Nat. Hist. (5) VIII. 1881, p. 173, and Challenger Macrura, 1888, p. 229: Haswell, Cat. Austral. Crust. 1882, p. 198: S. I. Smith, Proc. U.S. Nat. Mus. VIII. 1885, p. 170: Ortmann in Bronn's Thier Reich, Malacostraca, pp. 1118-1120: Holmes, Occas. Papers Calif. Acad. Sci. VII. 1900, p. 217: Kishinouye, Journ. Fisheries Bureau, Tokyo, VIII. No. 1, 1900: Alcock, Cat. Indian Deep Sea Crust. 1901, p. 13; and Ann. Mag. Nat. Hist. 7 (XVI) 1905, p. 510.

The "genus" *Peneus* (type *P. monodon*) was established in the year 1798 by Fabricius for three species from the "Indian Ocean." One of these species *P. planicornis*, is described as having the antennular flagella compressed, and so should, perhaps, be transferred to the genus *Solenocera* of Lucas.

H. Milne Edwards recognised eleven species of *Peneus*, but two of them have since been transferred to *Solenocera*.

In 1881, in a preliminary notice of the "Challenger" *Peneidea*[6] based upon a critical examination of the elder Milne Edwards' typical specimens, Spence Bate enumerated sixteen species under the genus *Peneus*, exclusive of one of Milne Edwards' species which he wrongly transferred to *Peneopsis*. [*Peneopsis* A. M. Edw., has never, I believe, been characterized formally; but as, like *Haliporus* and all *Peneinæ* except *Peneus*, it has a pair of arthrobranchiæ on the penultimate pair of legs, it need not be considered further in this place].

In 1885, in Vol. VIII of the Proceedings of the United States National

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1 *Vide* Cat. Indian Deep Sea Crust., p. 8, and Cat. Indian Decapod Crust., Pt. I. Fasc. i., p. 13.

2 *Vide* Cat. Indian Deep Sea Crust., p. 9.

3 *Vide* Cat. Indian Deep Sea Crust., p. 10.

4 *Vide* Cat. Indian Deep Sea Crust., p. 11.

5 *Vide* Cat. Indian Deep Sea Crust., p. 13.

6 Annals and Magazine of Natural History, (5) VIII, p. 169.

Museum, S. I. Smith divided the species of *Peneus* into two generic groups, namely (1) *Peneus* proper, with *P. caramote* and its kind as types, and (2) *Parapeneus*, typified by *P. longirostris* Lucas (=*P. membranaceus* of Heller). This arrangement has been accepted by most subsequent authors.

In 1891, in Vol. VIII (6th series) of the Annals and Magazine of Natural History, Wood-Mason took a further step in splitting from *Parapeneus* a third generic group *Matapeneus*, with *M. affinis* Edw. as the type. Wood-Mason also recognized, among the *Penei* lying outside the limits of Smith's restricted genus *Peneus*, that *P. styliferus* Edw. constituted a fourth distinct type, to which he gave the MS. name *Parapeneopsis*.

In 1896, in the Zoologischer Anzeiger, de Man described a new Peneid, which from the peculiar size and length of the 1st pair of male chelipeds he made the type of a distinct genus *Heteropeneus*. It now appears from[1] Nobili's observations, that the difference between *Heteropeneus* and *Peneus* is, perhaps, rather less than that between the latter genus and *Parapeneus*, *Metapeneus*, and *Parapeneopsis*.

At the present moment the number of valid species appertaining to the Peneus group is, perhaps, about 75. They may be distributed in 8 genera, namely: *Peneus* (sensu restricto), which is represented all round the globe in tropical and temperate latitudes; *Heteropeneus*, which is confined to the East Indian Archipelago; *Parapeneus* (sensu restricto), whose range extends from the W. Indies and Atlantic coasts of America westwards, through the Mediterranean, to Oriental seas and the western Pacific, and whose habitat is nectic rather than littoral; *Metapeneus*, which, with two doubtful exceptions in the West Indies, is restricted to the Indo-Pacific; *Parapeneopsis*, which is also restricted to the Indo-Pacific; *Xiphopeneus*, which is confined to tropical and subtropical parts of the Atlantic coast of America; *Trachypeneus*, which is found, on the one hand, off the West Indies and the neighbouring coasts of America, and, on the other hand, in Oriental seas from India to Japan; and *Atypopeneus*, which is known with certainty only from the Bay of Bengal, but perhaps occurs also in the China Sea.

The following are the diagnostic points common to the whole group :—

Rostrum well developed, laterally compressed. Carapace with post-antennular (antennal) and hepatic spines, sometimes with a small post-ocular (orbital) tooth or spine, and sometimes with a spine (branchiostegal) at or near its antero-inferior angles. *The cervical groove is never impressed across the tergum of the carapace.* Abdomen long, with some of its posterior somites compressed and their terga carinated.

Eyes large. Basal joint of antennular peduncle hollowed dorsally to lodge

[1] Bollettino dei Musei di Zoologia et Anatomia comparata della R. Universita di Torino, No. 455, 1903.

the eye; its outer edge terminates in a spine, and from the proximal end of its inner edge there springs a twisted setose scale (antennular scale) which forms a sort of inner wall to the orbit: the antennular flagella are cylindrical and tapering and may be short or long, but are never as long as the body. Antennal scale large and foliaceous; its outer edge is rigid and terminates acutely antennal flagellum very long. The mandible has a jagged cutting edge and a broad grinding crown: its palp (endopodite) is large and broadly foliaceous, consisting of two segments of which the anterior is very much the larger. The endopodite of the maxillule (1st maxilla) may be long and 2, 3, or 4 jointed, or may be without segmentation and truncated: that of the true maxilla is short.

The endopodite of the 1st maxillipeds is slender and 5-jointed, that of the 2nd and that of the 3rd consist of 7 segments. The exopodite of the 2nd and 3rd maxillipeds is very well developed, being curved, compressed, stiffish, and made up, like the flagella of the antennæ, of numerous small joints. The 3rd maxillipeds are long and pediform. The first three pairs of legs are chelate, the 1st pair usually being the shortest and the 3rd pair usually the longest. The last two pairs of legs are monodactylous. Exopodites are usually present on all or all but the last pair of thoracic legs, but are sometimes altogether wanting.

No podobranchiæ exist on any of the legs, and *only one arthrobranch*—the posterior one—*is present on the penultimate legs*. The gills are the modified phyllobranchiæ known as dendrobranchiæ: that is to say, each gill-plume consists of two series of plates arranged one on each side of a median stem, but each plate is more or less fringed or branched.

The abdominal appendages are of moderate length, the exopodite being longer than the endopodite. In the first pair there are no endopodites, but in the male their place is taken by a pair of more or less rigid, longitudinally pleated and convoluted plates, known as the "petasma" or "andricum," which together form a tube or canal. In the second pair the endopodite carries at its base in the male a fleshy papilla.

According to Zittel the first remains of *Peneus*, as far as is known at present, appear in the Lithographic slates of Bavaria (*Jurassic.*)

Key to the genera included in the Peneus *group.*

Indian genera are printed in capitals.

I. Rostrum serrated on both edges: a pleurobranch on the last thoracic somite (XIV): exopodites on all, or all but the last pair of the thoracic legs:—

1. First pair of chelipeds short and slender in both sexes ... PENEUS.
2. The first pair of chelipeds of the male are, typically, stouter and much longer than the 2nd and 3rd pairs ... ... *Heteropeneus.*

II. Rostrum serrated on its dorsal edge only :—

1. A pleurobranch on somite XIII but not on somite XIV :—

i. Exopodites on all, or all but the last pair of the thoracic legs ... ... METAPENEUS.

ii. No exopodites on any of the thoracic legs ... PARAPENEUS.

2. No pleurobranchiæ on somites XIII and XIV : all the thoracic legs with exopodites :—

i. Epipodites absent from at least the last three pairs of thoracic legs ... ... PARAPENEOPSIS.

ii. Epipodites absent only from the last two pairs of thoracic legs :—

a. Last two pairs of thoracic legs of normal form :—

α. Antennular flagella short ... TRACHYPENEUS.

β. Antennular flagella much longer than the carapace ... ATYPOPENEUS.

b. Last two pairs of thoracic legs flagelliform *Xiphopeneus*.

PENEUS, Fabr. (*sensu restricto*).

Sidney I. Smith, Proc. U. S. Nat. Mus. VIII. 1885, p. 170.
Type: *P. caramote*, Risso.

Rostrum toothed both dorsally and ventrally. Antero-inferior angles of carapace not spiniform. Post-antennular sulcus of carapace defined by a dorsal as well as by a ventral ridge.

Antennular flagella short or of moderate length. Endopodite of maxillules (1st maxillæ) elongate and distinctly three-jointed. Exopodites present on all, or all but the last pair of the thoracic legs.

Epipodites present on all but the last two thoracic appendages: pleurobranchiæ present on the six posterior thoracic somites.

Andricum symmetrical, simple, pod-shaped: it consists of two lobes finely interlocking all along their anterior border and capable of loose apposition in more or less of their posterior border, the opposed faces being concave.

The dactylus of the 3rd maxillipeds often shows modifications of a secondary sexual nature in the adult male.

The branchial formula is as follows:—

Somite	Podobranchiæ	Arthrobranchiæ	Pleurobranchiæ		Total
VII	ep.	1 (small)	0	=	ep. + 1
VIII	ep. + 1	2	0	=	ep. + 3
IX	ep.	2	1	=	ep. + 3
X	ep.	2	1	=	ep. + 3
XI	ep.	2	1	=	ep. + 3
XII	ep.	2	1	=	ep. + 3
XIII	0	1	1	=	2
XIV	0	0	1	=	1
Total	6ep. + 1	12	6	=	6ep. + 19

In addition to the Indian forms hereafter specified, I have examined the following species:—*P. caramote, P. australiensis, P. latisulcatus, P. brasiliensis, P. setifer, P. stylirostris.*

Key to the Indian species of the genus Peneus (*sensu restricto*).

I. Telson with three spinules in the distal half of each border: carapace with *three* median longitudinal dorsal grooves—one of which is excavated in the post-rostral crest—all extending nearly up to its posterior border ... ... *P. canaliculatus.*

II. Telson without marginal spinules: the three median dorsal grooves, if defined, never reach to the posterior border of the carapace:—

1. Exopodite of last pair of thoracic appendages absent or quite vestigial: a longitudinal post-antennal **subhepatic* crest near the antero-lateral angle of the carapace ... ... *P. semisulcatus.*

2. Exopodite of last pair of thoracic appendages small but well formed:—

i. An oblique post-antennal *subhepatic* crest near the antero-lateral angle of the carapace: upper antennular flagellum not longer than its peduncle ... *P. monodon.*

ii. No *subhepatic* crest on the carapace: upper antennular flagellum a good deal longer than its peduncle:—

a. Dactylus of external maxillipeds of adult male about as long as the propodite: rostral crest, in both sexes, of only moderate height ... ... *P. indicus.*

b. Dactylus of external maxillipeds of adult male hardly half the length of the propodite: rostral crest conspicuously high and of a broadly triangular form in both sexes ... ... *P. merguiensis.*

c. Dactylus of external maxillipeds of male from $1\frac{1}{2}$ to $2\frac{3}{4}$ times the length of the propodite: rostral crest high, but not forming a decided triangle ... ... *P. penicillatus.*

1. Peneus monodon, Fabricius, Bate. Plate I., fig. 1, 1*a-b*.

? *Penæus monodon*, Fabricius, Entomol. Syst., Suppl., p. 408, 1798: ? Bosc, Hist. Nat. Crust. II. p. 111, 1802: ? Latreille, Hist. Nat. Crust. VI. p. 249, 1803: ? Lamarck, Hist. Nat. Anim. sans Vert. V. p. 206, 1818: ? Desmarest, Consid. Gen. Crust., p. 225, 1825: Milne Edwards, Hist. Nat. Crust. II. p. 416, 1837: ? Krauss, Sudafr. Crust. p. 55, 1843: Stimpson, Proc. Acad. Philad. 1860, p. 44: Heller, Novara Crust., p. 122, 1865. Spence Bate, Ann. Mag. Nat. Hist. (5) VIII. 1881, p. 178, and Challenger Macrura, 1888, p. 250 (*part.*) pl. xxiv. fig. 1: Haswell, Cat. Austral. Crust. p. 199, 1882: ? Miers, P.Z.S., 1884, p. 15: Henderson, Trans. Linn. Soc. (2) V. 1893, p. 447 (*part.*) ? Ortmann in Semon's Zool. Forschungsr. in Austr. u.d. Malay. Arch., 1894, p. 9: ? de Man, Zool. Jahrb., Syst. X. 1898, p. 677: Doflein, Abh. bayer. Akad., München, XXI. iii. 1902, p. 632: ? Nobili, Boll. Mus. Torino, XVIII. 1903, No. 452, p. 1: ? Stebbing, Mar. Inv. S. Afr., Crust. III. 1905, p. 74.

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* The subhepatic crest (truly post-antennal in position) which is present only in *P. japonicus, semisulcatus* and *monodon*, is not to be confused with the strong oblique *post-antennular* crest (running from the so-called "antennal spine") which is present in all the species.

Penæus carinatus, Dana, U.S. Expl. Exp., Crust. pt. I. p. 602, pl. xl. fig. 2, 1852: Heller, Novara Crust. p. 123: Walker, Journ. Linn. Soc., Zool. XX. 1887, p. 112.

? *Penæus esculentus*, Haswell, P.L.S., N. S. Wales, 1879, p. 38, and Cat. Austral. Crust., p. 200, 1882: Stead, Zoologist (4) II. 1898, p. 209.

Penæus ashiaka, Kishinouye, Journ. Fish. Bur., Tokyo, VIII. i. 1900, pp. 7, 14, pl. iii: Rathbun, Proc. U.S. Nat. Mus. XXVI. 1902, p. 38: Nobili, Boll. Mus. Torino, XVIII. 1903, No. 455, p. 2.

The species here described and figured is the *P. monodon* figured in the Challenger Report: it differs from DeHaan's *P. semisulcatus* in having an exopodite on the last pair of thoracic legs. It is not the *P. monodon* of authors in general which appears to include *P. monodon* and *P. semisulcatus*.

Rostrum nearly straight, rarely reaching to, and still more rarely beyond, the tip of the antennular peduncle in the adult, though in the young it may be relatively longer: dorsally it has 6–8 (usually 7) teeth, ventrally 3. The dorsal teeth form a keel or crest of moderate height, which is continued as a deeply-grooved post-rostral crest to about one-third of an eye-length from the posterior border of the carapace: on either side of the crest is a groove, which ends just behind the last (epigastric) tooth.

The cervical groove is defined only in the neighbourhood of the hepatic spine, where it is deep.

There is no post-ocular spine; but the post-antennular ("antennal") spine is strong, and is continued obliquely backwards as a sharp ridge to the base of the strong hepatic spine. Above and parallel with this post-antennular crest is another short ridge, post-orbital in position, which meets the cervical groove; and between these two ridges is a deep post-antennular sulcus, more or less filled with tomentum, which undermines the hepatic spine. The branchial region is defined anteriorly by an *oblique* ridge and groove, which run from the base of the hepatic spine towards the base of the antenna.

The 4th—6th abdominal terga are carinated in the middle line, the 4th in its posterior three-fourths only; and the carina of the 6th ends acutely. The 5th abdominal somite is about two-thirds the length of the 6th, and the 6th is a little shorter than the telson. The lateral borders of the telson are non-spinose.

The antennular scale reaches well beyond the eyes: the upper or outer (longer) antennular flagellum is very considerably shorter than its peduncle.

The antennal scale reaches hardly half an eye-length beyond the tip of the antennular peduncle.

The external maxillipeds reach to the anterior third of the antennal scale: their dactylus, in the adult male, is about as long as the propodite, from the inner side of which it arises: from the tip of the propodite springs a pencil of setæ which can be lodged in the concave inner side of the dactylus: the tip of the dactylus is bluntly rounded. In the female the dactylus is a tapering joint articulating in the ordinary way end-on with the propodite.

The 3rd (longest) chelipeds usually reach, in the adult, nearly to the tip of the antennal scale; but their length varies somewhat according to sex and age.

In the 1st and 2nd chelipeds the ventral border of the basis is produced into an antrorse spine; and in the 1st alone the same border of the ischium is similarly but less acutely produced.

All the thoracic legs have an exopodite.

The "petasma," or "andricum," is symmetrical: it consists of two simple lobes which by their apposition form a sort of tube: the lobes (in the adult) are united all along their anterior (upper) edge by microscopic hooklets, and each lobe is deeply channelled and is strengthened all along its posterior (lower) edge by a strongly-calcified S-shaped rib.

The "thelycum" is rudely oval and consists of two lobes, the inner (opposed) edges of which are more or less raised.

This species grows to a length of over 9 inches.

The collection contains 44 specimens registered under the following numbers:—

$\frac{3927-3932}{9}$: $\frac{5053}{10}$	Orissa and Ganjam, 20-33 fathoms.	"Investigator."
$\frac{1143}{10}$: $\frac{1162}{10}$	Off Indus Delta, 30-72 fathoms.	
$\frac{5054}{10}$	G. of Martaban, 20 fathoms.	
$\frac{5055}{10}$	Off Pulicat (Madras).	
$\frac{4380-4382}{9}$	Madras and Pondichery.	Purchased.
[$\frac{3487-3492}{9}$: $\frac{4383-4386}{9}$]	Suez.	J. Wood-Mason.

2. Peneus semisulcatus, DeHaan. Plate I., fig. 2.

Penæus semisulcatus, De Haan, Faun. Japon. Crust., p. 191, pl. xlvi. fig. 1, 1849: Stimpson, Proc. Ac. Philad. 1860, p. 44: Heller, Novara Crust., p. 121, 1865: Miers, P.Z.S. 1878, p. 299 (*part.*): Haswell, P.L.S., N. S. Wales, 1879, p. 38, and Cat. Austral. Crust., 1882, p. 199: de Man, Notes Leyden Mus. II. 1880, p. 185, and Journ. Linn. Soc., Zool., XXII. 1888, p. 284, and in Max Weber's Zool. Ergebn. Niederl. Ost-Ind. II. 1892, p. 510, and Zool. Jahrb., Syst. etc., X. 1898, p. 677: Ortmann, Zool. Jahrb., Syst., V. 1890, p. 450 (*part.*): Nobili, Ann. Mus. Civ. Genov. (2) XX. 1899, p. 232, and 1900, p. 474: Lanchester, P.Z.S. 1901, II. p. 570: Doflein, Abh. Ak. München, 1902, p. 630.

? *Penæus semisulcatus* var *exsulcatus*, Hilgendorf, MB. k. Akad. Berlin, 1878, p. 843.

Penæus tahitensis, Heller, Novara Crust., pl. xi. fig. 2, 1865.

Penæus monodon, Kishinouye, Journ. Fish. Bur. Tokyo, VIII. i. 1900, pp. 7, 15, pl. ii. fig. 1, pl. vii. fig. 3, 3*a*.

The *P. monodon* of many authors includes this species, which strongly resembles *P. monodon* Fabr., but is distinguished by the following specific characters:—

The last pair of thoracic legs have no exopodite, or, at most and very rarely, a mere papilla-like vestige of one.

The rostrum has a distinct double curve, and commonly, even in large adults, reaches a short way beyond the tip of the antennular peduncle: the groove on either side of the rostrum is less distinct, and ends in front of the last (epigastric) tooth.

The cervical suture (which, as in *P. monodon*, is present only in the vicinity of the hepatic spine) is much less distinct; and the post-antennal or subhepatic ridge, which defines the branchial region anteriorly, is *horizontal*, not oblique.

The upper (outer) antennular flagellum is longer than its peduncle.

The external maxillipeds and third chelipeds may be a little longer, the latter sometimes reaching beyond the tip of the antennal scale; but as the length of these appendages varies with age and sex, this is not a character of much importance.

This species grows to a length of at least a foot. It is the commonest salt-water prawn of the Calcutta market, and is found all round the coasts of India and Ceylon from Karáchi to Mergui and the Andamans.

The collection contains 75 specimens, registered under the following numbers:—

$\frac{3123}{5}$: $\frac{4327\text{-}30}{9}$: $\frac{4336\text{-}38}{9}$	Hooghly Delta.	A. J. Milner and Mus. Collector.
$\frac{8155}{6}$	Mergui.	J. Anderson.
$\frac{8713}{6}$: $\frac{4326}{9}$	Andamans.	G. H. Booley: F. Day.
$\frac{3010}{7}$	Karáchi.	Karáchi Museum.
$\frac{4289\text{-}90}{7}$	Pulicat.	"Investigator."
$\frac{2971\text{-}98}{9}$: $\frac{5056}{10}$	Ganjam and Orissa.	"Investigator."
$\frac{4320\text{-}21}{9}$	Akyab.	F. Stoliczka.
$\frac{4322\text{-}24}{9}$: $\frac{4333\text{-}35}{9}$: $\frac{4339\text{-}41}{9}$	Madras and Pondicherry.	Purchased.
$\frac{4325}{9}$	Canara (Malabar coast).	F. Day.
$\frac{4496\text{-}99}{9}$	Bombay.	Purchased.
$\frac{4331}{9}$	Colombo.	J. Anderson.
$\frac{4342}{9}$	Nagasaki.	Berlin Museum.

3. Peneus indicus, Edw. Plate I. fig., 3, 3*a*.

Penæus indicus, Milne Edwards, Hist. Nat. Crust. II. p. 415, 1837: Dana, U.S. Expl Exp, Crust. pt. I., p. 604, 1852: Heller, Novara Crust p. 122, 1865: Hilgendorf, MB. Ak. Berlin, 1878, p. 844: Miers, P.Z.S., 1878, p. 301: Spence Bate, Ann. Mag. Nat. Hist. (5) VIII. 1881, p. 177, pl. xii. fig. 5, and Challenger Macrura, 1888, p. 248, pl. xxxiii. fig. 2: de Man, in Max Weber's Zool. Ergebn. Niederl. Ost-Ind. II. 1892, p. 511 pl. xxxix. fig. 53 and Zool. Jahrb., Syst., X. 1898, p. 680: Henderson, Trans. Linn. Soc. (2) V. 1893, p. 447: Ortmann in Semon's Zool. Forschungsr. Austral. etc. 1894, p. 10: Lanchester, Ann. Mag. Nat. Hist. (7) VI. 1900, p. 263: Nobili, Ann. Mus. Genova (2) XX. 1900, p. 474, and Boll. Mus. Torino, XVI. 1901, No. 397, p. 2, and XVIII. 1903, No. 447, p. 1, No. 452, p. 2, and No. 455, p. 2.

This is an extremely variable species, especially in respect of the length of the rostrum, which in young individuals projects far beyond the tip of the antennal scale, whereas in adults it is often not longer than that of *P. monodon*.

Large *adults* of *P. indicus* strongly resemble *P. monodon*, but differ constantly in the following particulars:—

The post-antennular ("antennal") and hepatic spines are not so strong and salient: the post-antennular or hepatic sulcus is not nearly so deep, and the ridges defining it are not so prominent: and there is *no sub-hepatic ridge defining the branchial region anteriorly*.

The rostrum has a manifest double curve, and usually reaches beyond the tip of the antennular peduncle; dorsally it has 8—10 teeth, ventrally 4—6. The groove on either side of the rostrum ends beside the last (epigastric) tooth. The post-rostral crest is faintly canaliculate, and ends nearly an eye-length in front of the posterior border of the carapace.

The upper (outer) antennular flagellum is about $1\frac{1}{2}$ times the length of the peduncle.

The sixth abdominal somite is as long as the telson.

This species attains a length of about 8 inches. It occurs all round the coasts of India and Ceylon, from Karachi to the Andamans.

There are 112 specimens in the collection, registered as follows:—

$\frac{3007\text{–}9}{7}$: $\frac{4371\text{–}72}{9}$	Karáchi	Karáchi Museum.
$\frac{4291\text{–}93}{7}$	Pulicat (Madras).	"Investigator."
$\frac{3999\text{–}4053}{9}$: $\frac{4231}{9}$: $\frac{5060}{10}$	Orissa and Ganjam.	"Investigator."
$\frac{4343\text{–}48}{9}$: $\frac{4350\text{–}51}{9}$	Malabar coast.	J. Wood-Mason.
$\frac{4349}{9}$	Madras.	Purchased.
$\frac{4352\text{–}54}{9}$	Colombo.	J. Anderson.
$\frac{4355}{9}$: $\frac{4716\text{–}18}{9}$	Andamans.	G. H. Booley.

4357-60/9 : 4363-64/9	Hooghly Delta.	J. Wood-Mason.
4361-62/9	Singapore.	J. Wood-Mason.
4682-85/9	Bombay.	Purchased.

3*a*. Peneus indicus var. merguiensis, de Man. Plate II., fig. 4.

Journ. Linn. Soc., Zool., XXII. 1888, p. 287, pl. xviii. fig. 8, xix. fig. 1.

Dr deMan, who at first regarded this form as distinct, has since (in Max Weber's Zool. Ergebn. einer Reise in Niederl. Ost-Ind. II., p. 511) united it with *P. indicus* Edw. Dr J. R. Henderson concurs.

Large adults of this variety are distinguished by the rostral crest, which is so high as to assume a broadly-triangular form: beneath the crest the rostrum is nearly straight.

Adult males are further distinguished by the form of the dactylus of the external maxillipeds, which joint is *hardly half the length of its propodite* and has a subacute point.

This form reaches a length of over 8 inches.

There are 66 specimens in the collection, registered as follows:—

3188/5		Karáchi.	Karáchi Museum.
8154/6	Types.	Mergui.	J. Anderson.
2481/7		Hooghly Delta.	J. H. Row.
4366-70/9 : 4376-79/9		No Locality.	J. Wood-Mason.
3944-70/9 : 5061/10		Orissa and Ganjam.	"Investigator."
421-426/10		Palk Strait.	
4373-75/9		Bombay.	F. Day.

3*b*. Peneus indicus var. penicillatus. Plate II., fig. 5.

Penæus penicillatus, Wood-Mason MS. (name only): Alcock, Ann. Mag. N.H. (7) XVI. 1905, p. 525.

This variety is distinguished by the form of the 3rd or external maxillipeds of the male. In these appendages the carpus and propodite are much shorter and coarser than they are in *indicus* and *merguiensis*, but on the other hand *the dactylus is a long tapering joint from* $1\frac{1}{2}$ *to* $2\frac{3}{4}$ *times the length of the propodite*, and the pencil of hairs occupying the groove on the inner side of the dactylus is of almost corresponding length.

The rostral crest is not so high as that of *indicus* var. *merguiensis*, but is higher than that of typical *indicus*, and this intermediate form of rostrum also characterizes females taken in company with males of *penicillatus*.

This form grows to a length of six inches.

There are 28 specimens in the collection, registered as follows:—

$\frac{9277}{6}$	Mergui.	"Investigator."
$\frac{3933\text{–}43}{9}$	Orissa Coast.	
$\frac{3044}{7}$	Karáchi.	Karáchi Museum.
$\frac{4356}{9}$: $\frac{4365}{9}$	Hooghly Delta.	Purchased.
$\frac{4394}{9}$: $\frac{4671\text{–}81}{9}$	Bombay.	

The striking characters of *merguiensis* and *penicillatus* are shown in the external maxillipeds of the male—appendages which in certain species of *Aristæus*, *Hemipeneus*, and *Benthesicymus* also exhibit secondary sexual differences. But the fact that, in the forms now under consideration, the differences in the male external maxillipeds are correlated with a decided difference in the shape of the rostrum, which is also shared by the females taken in the same company, precludes us, for the present, from regarding *merguiensis* and *penicillatus* as allomorphic males of *P. indicus*, or as anything but incipient species.

4. Peneus canaliculatus, Oliv. Plate II., fig, 6*a.-c.*

Penæus canaliculatus, Olivier, Encyclopédie Methodique VIII. p. 660, 1811: Milne Edwards, Hist. Nat. Crust., II. 1837, p. 414: ? ? DeHaan, Faun. Japon. Crust., p. 190, 1849: Stimpson, Proc. Acad. Philad, 1860, p. 44: Heller, Novara Crust., 1865, p. 121: Hilgendorf in v. d. Decken's Reisen Ost-Afr. III. i. 1869, p. 102, and MB. Ak. Berl. 1878, p. 843: Miers, P.Z.S. 1878, p. 298: Haswell, P.L S., N.S. Wales, 1879, p. 38, and Cat. Austral. Crust. 1882, p. 198: ? Spence Bate Ann. Mag. Nat. Hist. (5) VIII. 1881, p. 174, and Challenger Macrura, 1888, p. 243, pl. xxxii. fig. 1, 2: Ozorio, Journ. Sci. Math. Phys. Nat. Lisb. XI. 1885-87, p. 230: de Man, Notes Leyden Mus. II. 1880, p. 185 and Archiv f. Naturges. LIII. i. p. 564, 1887-88, and in Weber's Zool. Ergebn, Niederl. Ost-Ind. II. 1892, p. 510: Ortmann, Zool. Jahrb., Syst. V. 1890, p. 448, pl. xxxvi. fig. 2*a*, *b*: Henderson, Trans. Linn. Soc. (2) V. 1893, p. 450: Stead, Zoologist, 1898, p. 209: Nobili, Ann. Mns. Genov. 1899, p. 232, and 1900, p. 474, and Boll. Mns. Torino, 1901, No. 397, p. 1: Borradaile in Stomap. and Macr. of Willey's Exp., 1899, pp. 395, 398, 404: Kishinouye, Journ. Fish. Bur. Tokyo, VIII. i. 1900, pp. 6, 11, pl. i, pl. vii. fig. 1, 1*a*: Whitelegge, Mem. Austral. Mns. IV. pt. 2, 1900, p. 197: Rathbun, P.U.S. Nat. Mns., 1900, p. 311: ? Lanchester, P.Z.S. 1901, II. 571, pl. xxxiv. fig. 5: Doflein, Abh. bayer. Ak. München, 1902, p. 630.

Penæus canaliculatus var. *japonicus*, Spence Bate, Challenger Macrura, p. 245 pl. xxxi, xxxii. fig. 4, xxxvii. fig. 2, 1888.

Penæus canaliculatus var. *australiensis*, Spence Bate, *op. cit.* p. 248, pl. xxxii. fig. 3: de Man, Abh. Senckenb Nat. Ges., 1902, p. 905.

Penæus marginatus, Randall, Journ. Acad. Nat. Sci. Philad. 1839, p. 146.

Penæus plebejus, Hess, Arch. f. Naturges. xxxi. i. 1865, pp. 168, 172, pl. vii. fig. 19: deMan, Zool. Jahrb., Syst., II. 1887, p. 714.

The Indian form agrees with Kishinouye's figures of *P. canaliculatus* and with Spence Bate's of *P. canaliculatus* var. *japonicus*. As Stimpson and others have remarked, DeHaan's description certainly does not apply to this species.

The largest of our Indian specimens is 7 inches long.

The rostrum, which is slightly double-curved, reaches just beyond the tip of the antennular peduncle: dorsally it has 9–11 teeth, ventrally 1. The groove on either side of the rostral crest is co-extensive with the post-rostral crest (which is itself canaliculate) to within half-an-eye-length of the posterior border of the carapace.

There is a small post-ocular spine, continued as a short ridge running parallel with the rostral crest; posteriorly this ridge is recurved on itself to form a narrow loop. The post-antennular ("antennal") spine is very strong and, as in other species, is continued obliquely backwards as a sharp ridge to the base of the hepatic spine. The oblique post-orbital crest is longer and more oblique than in any of the preceding species. As usual, the cervical groove is present only in the vicinity of the hepatic spine. The subhepatic crest and groove, defining the anterior limit of the branchial region, are very distinct, and take a somewhat sinuous course from a point near the antero-lateral angle of the carapace to a point lying vertically below the posterior limit of the cervical groove.

The antennular scale does not itself reach beyond the eyes, though its setæ do. The antennular flagella are less than half the length of their peduncle.

The external maxillipeds and 3rd chelipeds reach to about the middle of the antennal scale. In males which appear to be adult the dactylus of the external maxillipeds is hardly half as long as its propodite and articulates almost end-on with it. There is no distinct spine on the ischium of the 1st chelipeds, but the spine on the basis of this and of the next appendage is very strong. The last pair of thoracic legs, as in all Indian species except *semisulcatus*, have an exopodite.

On either lateral border of the telson, in its distal half, are three spinules.

The andricum is structurally like that of *P. monodon*, except that the distal end of the anterior (apposed) border of each lobe is prolonged to form a fleshy lobule of some size. The "thelycum" has the form of a pocket (open anteriorly) owing to the fusion of its lobes.

There are 9 specimens in the Indian Museum, registered as follows:—

$\frac{1282}{7}$: $\frac{7981}{9}$	Hooghly Delta.	Bengal Pilot Service.
$\frac{2764}{7}$	Andamans.	G. H. Booley.
$\frac{3923}{9}$	Orissa Coast.	"Investigator."

1145/10	Off Indus Delta, 30—40 fathoms. "Investigator."	
4395/9	Japan.	J. Wood-Mason.
2072/10	Fiji Is.	British Museum.

Heteropeneus, de Man.

deMan, Zool. Anzeiger, 1896, p. 111, and Zool. Jahrb., Syst. Abth. X. 1898, p. 684, pl. xxxviii. fig. 75. Nobili, Boll. Mus. Torino XVIII. 1903, No. 455, p. 4.

Rostrum toothed both dorsally and ventrally. Antero-inferior angles of carapace not spiniform. Post-antennular sulcus defined ventrally only, by the buttress of the post-antennular (antennal) spine.

Antennular flagella short. The first pair of thoracic legs may, in the adult male, be enormously elongate, especially as to the propodite; but in the female, and, as Nobili has shown, in certain adult males, may be of the ordinary *Peneus* form. Exopodites are present on all the thoracic legs.

According to Nobili, epipodites are present on all but the last two thoracic appendages, and pleurobranchiæ on the six posterior thoracic somites.

Andricum symmetrical, simple, much as in *Peneus* (s. r.)

According to Nobili, the branchial formula is the same as that of *Peneus* (s. r.)

Only the following species is known:—

Heteropeneus longimanus de Man, *loc. cit.;* see also Nobili, *loc. cit.;* from the Java Sea and Singapore. Not represented in the collection of the Indian Museum, but included here as it is an Oriental species and may reasonably be expected to occur within the limits of British India.

Metapeneus, Wood-Mason.

Metapenæus, Wood-Mason, Ann. Mag. Nat. Hist. (6) VIII. 1891, p. 271.
Type: *M affinis*, Edw.

Rostrum toothed on its dorsal edge only. Antero-inferior angles of carapace either rounded or spiniform. Post-antennular sulcus defined only ventrally, by the buttress of the post-antennular (antennal) spine. No longitudinal or transverse sutures on the carapace.

Antennular flagella short or of moderate length. Endopodite of maxillules (1st maxillæ) somewhat abbreviated, two-jointed. Exopodites present on all, or all but the last pair of thoracic legs.

Epipodites absent from the 3rd maxillipeds as well as from the last two thoracic appendages. No pleurobranch on the last thoracic somite.

Andricum complicated, symmetrical or asymmetrical: if symmetrical, its

distal angles are more or less spout-like: if asymmetrical, one lobe is either larger or longer than the other and both are split up into interleaved convoluted lobules.

The 3rd maxillipeds never exhibit secondary sexual characters in the male, but the last pair of thoracic legs sometimes do.

The branchial formula is :—

Somite	Podobranchiæ	Arthrobranchiæ	Pleurobranchiæ		Total
VII	ep.	r	0	=	ep.+r
VIII	ep.+1	2	0	=	ep.+3
IX	0	2	1	=	3
X	ep.	2	1	=	ep.+3
XI	ep.	2	1	=	ep.+3
XII	ep.	2	1	=	ep.+3
XIII	0	1	1	=	2
XIV	0	0	0	=	0
Total	5 ep.+1	11+r	5	=	5ep.+17+r

In addition, a small filamentous vestige of an anterior arthrobranch is present on the penultimate thoracic somite in all the species I have examined, which include, besides the Indian species, *M. Joyneri*, *M. tenellus*, *M.Macleayi*, *M. philippinensis*, *M. Richtersi*, and *M. Batei*.

Key to the Indian species of the genus Metapeneus.

I. Telson without lateral marginal spinules: antero-lateral (antero-inferior) angles of carapace without a spine: last pair of thoracic legs without exopodite, their merus, *in the adult male*, with a notch and spine at base:—

1. The rostrum in adults reaches nearly to, or beyond, the tip of the antennular peduncle:—
   - i. Last pair of thoracic legs seldom reach to tip (usually reach a little beyond middle) of antennal scale ... *M. monoceros.*
   - ii. Last pair of thoracic legs usually surpass (sometimes by a dactylus-length) the tip of the antennal scale ... *M. affinis.*
   - iii. Last pair of thoracic legs fall considerably short of the middle of the antennal scale, and often in the female are merely horn-capped stumps: inner antennular flagellum the longer ... ... *M. Dobsoni.*
2. The rostrum, in adults, sometimes just surpasses, sometimes hardly reaches, the eyes:—
   - i. Rostrum rarely reaches middle of antennular peduncle: last pair of thoracic legs reach more than a dactylus-length beyond the tip of the antennal scale ... *M. brevicornis.*
   - ii. Rostrum rarely reaches middle of eye: last pair of thoracic legs do not reach tip of antennal scale ... *M. Lysianassa.*

II. Telson with lateral marginal spines at its distal end:—

1. No exopodite to last pair of thoracic legs: no branchiostegal spine at antero-inferior angles of carapace ... ... *M. ensis.*

2. Last pair of thoracic legs with exopodite: a branchiostegal spine: no notch and spine on merus of last pair of thoracic legs of male:—

i. Inner antennular flagellum much longer than outer,—as long as its peduncle:—

a. Median limb of thelycum a short ridge ... *M. coniger.*

b. Median limb of thelycum a broad, undermined plate, with its free (posterior) edge recurved and bilobed ... ... *M. andamanensis.*

ii. Antennular flagella equal,—about one-third the length of the peduncle:—

a. A stridulating organ on each side of the carapace, playing against the free edge of the 1st abdominal tergum ... ... *M. stridulans.*

b. No stridulating organs on carapace ... *M. mogiensis.*

1. Metapeneus monoceros, Fabr. Plate III., fig. 7, 7 *a-c*.

Penæus monoceros, Fabricius, Entomol. Syst., Suppl., p. 409, 1798: ?(Bosc, Latreille): Milne Edwards, Hist. Nat. Crust., II. p. 415, 1837: ? Dana, U.S. Expl. Exp. Crust. pt. I. p. 605, pl. xl. fig. 5, 1852: Stimpson, Proc. Acad. Philad. 1860, p. 44 (*part.*): Miers, P.Z.S., 1878, p. 301: Hilgendorf, MB. Ak. Berl. 1878, p. 844: Spence Bate, Ann. Mag. Nat. Hist. (5) VIII. 1881, p. 177, pl. xi. fig. 2: Haswell, Cat. Austral Crust., 1882, p. 200: Ortmann, Zool. Jahrb., Syst., V. 1890, p. 450, (*part.*) pl. xxxvi. fig. 3*b*. (not 3*a*): Thallwitz, Abh. u. Ber. Mus. Dresden, 1890-91, No. 3, p. 2: de Man in Weber's Zool. Ergebn. Niederl. Ost-Ind. II. 1892, p. 513, fig. 54, and Zool. Jahrb., Syst., X. 1898, p. 680: Doflein, Abh. bayer Akad, München 1902, p. 631.

Metapenæus monoceros, Nobili, Boll. Mus. Torino, XVIII. 1903, No. 452, p. 3, and No. 455, p. 3.

Penaeus incisipes, Kishinouye, Journ. Fish. Bur., Tokyo, VIII. i. 1900, p. 18, pl. iv. fig. 2, pl. vii. fig. 6, 6*a* (*nec* Bate).

Body covered with a harsh and very short tomentum.

Rostrum nearly straight, uptilted, reaching nearly to, or a little beyond, the tip of the antennular peduncle; armed dorsally with 9—12 teeth, which do not form much of a crest. Post-rostral crest continued to, or almost to, the posterior border of the carapace.

Antero-lateral angles of carapace broadly rounded off. A very small post-ocular (orbital) tooth. Post-antennular (antennal) spine strong, produced as a salient ridge to the base of the small hepatic spine, the ridge bounding a well marked post-antennular groove which meets the cervical groove. Gastric region defined anteriorly, on either side of the rostrum, by a short oblique post-orbital groove. Branchial region defined (1) anteriorly, by a deep and narrow crescentic groove (anterior part of cervical groove) which embraces the base of the post-antennular ridge and meets the post-antennular groove, and (2) superiorly, by a sinuous ridge—most distinct in its posterior half—which runs from the hepatic spine almost to the posterior border of the carapace.

The 2nd—6th abdominal terga, usually the 1st also, are carinated

mid-dorsally, the (1st) 2nd and 3rd bluntly, incompletely and somewhat inconspicuously, the 4th—6th very sharply and almost completely. The 5th abdominal somite is about two-thirds the length of the 6th, the 6th is a little shorter than the telson. The telson is shorter than the inner caudal swimmeret, and has no marginal spines.

Eyes very large, slightly surpassed by the antennular scale. The outer (upper) antennular flagellum, which is slightly longer than the inner, is not much more than half the length of its peduncle.

The 3rd maxillipeds barely reach the middle of the antennal scale: their dactylus in the male is not modified; but consists of a slender, setose, tapering joint, about four-fifths the length of the propodite with which it articulates end-on.

There is a strong antrorse spine on the basis of all three pairs of chelipeds.

In the *adult* male the last pair of thoracic legs has the proximal end of the merus notched on its outer side, the notch being deepened anteriorly by a large retrorse and introrse, hook-like spine, and posteriorly by a sub-terminal lobule on the posterior border of the ischium. Beyond the spine the edge of the merus is finely denticulate in more or less of its extent. In both sexes the three terminal joints of these fifth legs are slender, and the dactylus rarely reaches much beyond the middle third of the antennal scale. No exopodite is present on the fifth pair of legs.

The andricum is quite symmetrical. In the adult it consists of two rigid segments tightly folded in all their length, interlocked all along their anterior margin, and in close apposition along a great part of their posterior margin, so as to form a compressed tube. Distally the tube ends in a pair of large gargoyles, the posterior lips of which are convoluted like the mouth of a personate corolla.

The thelycum is concave, the hollow being bounded (1) laterally by a pair of ear-like lobes, the salient free edge of which is often incurved, and (2) anteriorly by a median tongue that projects and is embedded between two lobes of the sternum corresponding with the penultimate pair of legs.

This species may attain, though rarely, a length of $6\frac{1}{2}$ inches.

It is one of the commonest of the Indian prawns. In the Museum collection there are 281 specimens, registered as follows :—

1547	Pondicherry.	Purchased.
$\frac{2480}{7}$	Sandheads, R. Hooghly.	J. H. Row.
$\frac{4134\text{–}44}{9}$: $\frac{4165}{9}$: $\frac{4173}{9}$	Orissa coast.	"Investigator."
$\frac{4535\text{–}4670}{9}$	Bombay.	Purchased.

$\frac{401\text{-}20}{10}$: $\frac{434\text{-}40}{10}$	Palk Strait.	"Investigator."
$\frac{1144}{10}$	Off Indus Delta, 30—40 fathoms.	
$\frac{5065}{10}$	Ganjam and Vizagapatam, 10—30 fath.	
$\frac{5066}{10}$	Coromandel coast, 80—110 fathoms.	
$\frac{5067}{10}$	Gulf of Martaban, 20 fathoms.	
$\frac{5068}{10}$	Akyab.	F. Stoliczka.
[$\frac{8444}{6}$: $\frac{4881\text{-}82}{9}$	Hongkong.	R. Hungerford: G. Dennys.]

2. Metapeneus affinis, Edw. Plate III., fig. 8, 8*a-b*.

Penæus affinis, Milne Edwards, Hist. Nat. Crust. II. p. 416, 1837: Spence Bate, Ann. Mag. Nat. Hist. (5) VIII. 1881, p. 179, pl. xii. fig. 6: Ortmann, Zool. Jahrb., Syst. V. 1890, p. 450 (*P. monoceros* partim): Henderson, Trans. Linn. Soc. (2) V 1893, p. 448 (*part.*): Kishinouye, Journ. Fish. Bur., Tokyo, VIII. i. 1900, p. 16, pl. iv. fig. 1, pl. vii. fig. 5, 5*a*.: Lanchester, P Z.S. 1901, II. p. 572: Rathbun, Proc. U. S. Nat. Mus. xxvi. 1902, p. 38: Nobili, Boll. Mus. Torino, xviii. 1903, No. 455, p. 2 (*Metapenæus*).

Penæus incisipes, Spence Bate, Challenger Macrura, p. 257, pl. xxxiv. fig. 2, 1888.

This species closely resembles *M. monoceros*; but adults are distinguished from that species by the form of the andricum and thelycum.

The andricum has the same general form, buts ends distally in a pair of two-lipped spouts which look something like a pair of short horns.

The thelycum is more setose; its lateral lobes, instead of presenting a sharp, salient edge, are flattish and are transversely cut into two unequal segments.

Other points which separate it from *M. monoceros* are the following, in the case of adults:—

The rostrum is more curved, less uptilted, and usually a little longer, and not seldom has fewer than 9 teeth: the post-rostral crest is less distinct and fades away some distance in front of the posterior border of the carapace. Also the carination of the anterior abdominal terga is less distinct.

The upper antennular flagellum is longer, being three-fourths the length of the peduncle, or more.

The last pair of thoracic legs in both sexes usually surpass the tip of the antennal scale, sometimes by the whole length of the dactylus. In the male, there is no lobule on the posterior edge of the ischium of these legs, the notch in the merus is bounded by a twisted tooth instead of a curved spine, and the edge of the merus beyond the tooth is entire.

This species very rarely attains a length of $6\frac{1}{2}$ inches. There are 81 specimens in the Indian Museum registered as follows:—

$\frac{4096-4133}{9}$: $\frac{4145-64}{9}$	Orissa coast.	"Investigator."
$\frac{5069}{10}$	Ganjam coast, 7—29 fathoms.	
$\frac{4692}{9}$	Madras.	Purchased.
$\frac{4693}{9}$	Colombo.	J. Anderson.
$\frac{4696-4701}{9}$	Karáchi.	Karáchi Museum.

3. Metapeneus Dobsoni, Miers. Plate III., fig. 9, 9*a-d*.

Penæus Dobsoni Miers, P.Z.S., 1878, p. 302, pl. xvii. fig. 2; J. R. Henderson, Trans. Linn. Soc. (2) V. 1893, p. 449.

Metapenæus Dobsoni, Nobili, Boll. Mus. Torino, 1903, No. 452, p. 3.

In general characters this species resembles *M. monoceros*, but exhibits the following diagnostic points of difference:—

The tomentum is less harsh, less abundant, and more patchy.

The rostrum, which has only 8 or 9 teeth, is usually a little longer, and it has a well-marked double curve. The post-rostral crest fades away well in front of the posterior border of the carapace; and the anterior abdominal terga are not, or only most obscurely, carinated. The post-antennular (antennal) spine is not very strong and is not continued backwards as a strong ridge, so that the post-antennular sulcus is not so deep.

The *inner* antennular flagellum is the longer, exceeding its peduncle in length.

All the legs are shorter and more ciliated, and the chelæ are unusually weak. In the male the spine on the basis of the 3rd pair of chelipeds is a great barb projecting considerably beyond the base of the merus, somewhat like that of *M. Joyneri*.

The last pair of thoracic legs do not nearly reach the middle of the antennal scale: in the male, owing to a twist in the ischium, the large tooth (completing the notch) at the proximal end of the merus is turned forwards and outwards; and anterior to this tooth there may be a second smaller tooth, but no row of denticles. In the adult female the last pair of thoracic legs is generally represented by a coxa, to which is articulated a horny stump: this is the case in 62 out of the 69 females in our collection; but of the remaining 7, 5 have a normal leg—short and weak like that of the male, but without notch or spine on merus—on one side, and 2 have a pair of normal legs.

The andricum is much like that of *M. monoceros*, but ends in a pair of simple spouts; and where the spouts take-off there are 4 papillæ, or short filaments—two anterior and two posterior.

The thelycum consists of a broad concave median tongue, not embraced by any lateral processes of the penultimate thoracic sternum, but more or less ensheathed posteriorly in a salient horse-shoe-shaped process formed by union of the lateral lobes of the organ itself.

This species rarely exceeds 4½ inches in length. It is common all along the east coast, from Orissa to Vizagapatam, where in one season I collected nearly 100 specimens; and it has also been taken at Coconada, Madras, Colombo, and off the Malabar coast.

Nobili, who records this species from Pondichery and Mahé, has already remarked that the 5th pair of legs may be properly developed in the female. This author is probably righ in considering their usual stump-like condition to be a phase of regeneration after loss; but whether the loss is accidental, or is normal to the reproductive process, is a question to be asked.

The Museum possesses 126 specimens, registered under the following numbers:—

$\frac{3917}{9}$ ♀ Cotype.	Mangalore (Malabar coast).	British Museum.
$\frac{3918}{9}$: $\frac{5070\text{-}74}{9}$: $\frac{5919}{9}$	Ganjam: Vizagapatam: Coconada.	"Investigator."
$\frac{3920\text{-}22}{9}$	Orissa coast.	
$\frac{4481}{9}$: $\frac{4487\text{-}90}{9}$	Madras.	Purchased.
$\frac{4482\text{-}86}{9}$	Colombo.	J. Anderson.

• 4. Metapeneus brevicornis, Edw. Plate IV., fig. 10, 10*a*, *b*.

Penæus brevicornis, Milne Edwards, Hist. Nat. Crust. II. p. 417, 1837: Richters, in Möbius, Meeresf. Maurit. 1880, p. 166: Spence Bate, Ann. Mag. Nat. Hist. (5) VIII. 1881, p. 180, pl. xi. fig. 3: Henderson, Trans. Linn. Soc. (2) V. 1893, p. 450: de Man, Zool. Jahrb., Syst., X. 1897, p. 681: Lanchester, P.Z.S., 1901, II. p. 571.

Penæus avirostris, Dana, U.S. Expl., Exp., Crust., pt. I. p. 603, pl. xl. fig. 3, 1852: Heller, Novara Crust. p. 123, 1865: Miers, Ann. Mag. Nat. Hist. (5) V. 1880, p. 457.

Penæus sp., Lanchester, *t.c.*, p. 571, pl. xxxiv. fig. 7.

Metapenæus avirostris, Nobili, Boll. Mus. Torino, 1903, No. 447, p. 2.

Compared with *M. monoceros* this species shows the following difference:—

It is not, or very little, tomentose. The rostrum is curved and rarely reaches to the middle of the 2nd joint of the antennular peduncle, sometimes only just surpassing the eyes: dorsally it bears 7 teeth, which form a decided crest. The post-rostral crest, however, is very indistinct, and only just reaches into the posterior third of the carapace. The post-antennular (antennal) spine is weak and is not continued as a well-cut post-antennular ridge, so that the post-antennular groove is shallow. The hepatic spine is very small. The subhepatic groove (anterior part of cervical groove) which defines the branchial region anteriorly, is shallow and does not meet the hepatic spine. The ridge

defining the branchial region superiorly is present only in the posterior part of the carapace, and even there is indistinct.

The median carina of the 2nd abdominal tergum is absent; that of the 3rd is hardly perceptible; that of the 4th present only in the posterior two-thirds. The 6th abdominal somite is as long as the telson.

The outer antennular flagellum is nearly as long as the peduncle.

The last pair of thoracic legs reach more than a dactylus-length beyond the tip of the antennal scale: in the adult male there is notch in the posterior border of the merus at its proximal end, the notch being bounded by a small tooth (not a spine) beyond which there are no denticles; nor is there any subterminal lobe on the border of the ischium.

The andricum is built like that of *M. monoceros*, but ends in a pair of simple spouts each of which carries, near its middle, a longish filament.

The thelycum is concave like that of *M. monoceros*: its median lobe is shaped like a figure of eight, the anterior portion being embraced between processes of the antepenultimate thoracic sternum, the posterior portion being embraced by the flat crescent-shaped lateral lobes.

This species very rarely attains a length of 5 inches. It is represented in our collection by only 18 specimens, registered as follows:—

$\frac{3189}{5}$: $\frac{4476\text{–}77}{9}$	Karáchi.	Karáchi Museum.
$\frac{2738\text{–}39}{7}$	Salt Lakes, Calcutta.	Museum collector.
$\frac{1383\text{–}85}{9}$	Tavoy ?	
$\frac{4234}{9}$	Off Ganjam, 23 fathoms.	"Investigator."
$\frac{3393}{10}$	Off Amherst (G. of Martaban).	
$\frac{4475}{9}$	Penang.	F. Stoliczka.
$\frac{4478\text{–}80}{9}$	India.	No history.
$\frac{4694}{9}$	Madras.	Purchased.

5. Metapeneus Lysianassa, (de Man). Plate IV., fig. 11, 11*a-c*.

Penæus Lysianassa, de Man, Journ. Linn. Soc., Zoöl., xxii. 1888, p. 290, pl. xix. fig. 1: Nobili, Boll. Mus. Torino, 1903, No. 455, p. 4 (*Metapenæus*).

This species comes very close to *M. brevicornis*, from which it is distinguished by the following characters:—

The rostrum is shorter, in large individuals hardly reaching to the cornea, and even in young individuals barely reaching the middle of the eyes: it forms

a high rhomboidal crest. The post-rostral crest is distinct but is broad and blunt, and bifurcates near the posterior border of the carapace. The sinuous ridge defining the branchial region superiorly is more distinct. The 6th abdominal somite may be slightly longer than the telson.

The antennular flagella are $1\frac{1}{3}$ times the length of their peduncle, or even more.

In the male the merus of the 4th pair of thoracic legs is compressed, and its posterior border is expanded and crest-like, most so posteriorly.

The last pair of thoracic legs do not reach the tip of the antennal scale: in the male the tooth bounding the notch at the proximal end of the merus is very large, compressed, and recurved: in the female the anterior margin of the ischium is often dilated and compressed so as to form a high crest.

The andricum is of much the same form, but the spout-like terminations of its distal corners are bifurcate and their free filament is very short.

The anterior (median) and posterior (lateral) lobes of the thelycum are all of about the same size, so that the organ has much the shape of an ace of clubs without the shaft.

An exceptionally large female is $3\frac{1}{4}$ inches long.

The collection contains only 13 specimens, registered as follows:—

$\frac{8240}{6}$	Types of ♂	Mergui.	J. Anderson.
$\frac{8241}{6}$			
$\frac{8242}{6}$	Types of ♀		
$\frac{3924\text{–}26}{9}$		Orissa coast.	"Investigator."
$\frac{7217}{9}$		G. of Martaban, 20 fathoms.	
$\frac{4695}{9}$		Sandheads, R. Hooghly.	J. H. Row.

6. Metapeneus ensis? (DeHaan)

? *Penæus monoceros ensis*, De Haan, Fauu. Japon. Crust., p. 192, pl. xivi. fig. 2. ? *Penæus intermedius*, Kishinouye, Journ. Fish. Bureau, Tokyo, VIII. 1900, p. 21.

The specimens which I am inclined to refer to this species are young, and the males may not have acquired their secondary sexual characters. They resemble the young of *M. monoceros*, and in the semi-final sorting of the collection were assigned to that species; but on final examination, when each specimen was compared with a standard, they were found to possess three pairs of

articulating marginal spines at the distal end of the telson. They were taken near Port Blair in the Andamans.

$\frac{5075}{10}$	Andamans.	J. Wood-Mason.

7. Metapeneus coniger, Wood-Mason. Plate IV., fig. 12, 12*a-b*.

Metapenæus coniger, Wood-Mason, Ann. Mag. Nat. Hist. (6) VIII. 1891, p. 272. Illustrations of the Zool. Investigator, Crust. pl. L. fig. 2, 2*a*, *b*: Alcock, Cat. Indian Deep Sea Crust., 1901, p. 16.

Body tomentose.

Rostrum faintly curved, nearly horizontal, not quite reaching end of antennular peduncle in the male but slightly surpassing it in the female, with 6 or 7 (rarely 8) teeth dorsally, in addition to a small isolated epigastric tooth, the teeth not forming much of a crest: no appreciable post-rostral carina behind the gastric region. A small post-ocular angulation, but no spine. Post-antennular (antennal) spine moderate, not continued backwards as a distinct ridge, so that the post-antennular sulcus is faint. Antero-lateral (antero-inferior) angles of carapace broadly rounded-off but bearing a small (branchiostegal) spine. Hepatic spine small. Branchial region very obscurely defined, (1) by a faint groove (anterior portion of cervical groove) running from near the antero-lateral angle of the carapace to the base of the hepatic spine, (2) by a faint sinuous groove running from the hepatic spine nearly to the posterior border of the carapace.

The 2nd abdominal tergum bears traces of a median carina anteriorly, the 3rd—6th terga are sharply carinated, and the 4th—6th are also distinctly subcarinate on either side of the middle line. The 6th abdominal somite is about twice as long as the 5th, and about as long as the telson. The telson is about as long as the inner caudal swimmeret: it ends very acutely and has on each side, near the tip, 4 marginal spines of which the last alone is fixed.

Eyes very large. The inner antennular flagellum, which is much longer than the outer, is as long as or longer than the peduncle: in the male its inner border is concave, at the proximal end, up to a small conical denticle.

The external maxillipeds reach to or nearly to the tip of the antennal scale: the dactylus, in both sexes, is a slender joint, about three-fourths the length of the propodite, with which it articulates end-on: the basis bears a strong antrorse spine.

A similar spine exists on the basis (and on the ischium also) of the 1st pair of chelipeds only. In the female only there is a pair of minute sternal spines between the 2nd chelipeds. The 5th pair of thoracic legs reach the middle of the antennal scale and are not in any way modified in the male. All the thoracic legs have exopodites.

The andricum, which is longitudinally chanelled both anteriorly and posteriorly, is a little asymmetrical, one lobe—usually the left—being a little longer and larger than the other. It consists of a pair of intimately connected lobes, each of which splits up into two convoluted petaloid lobules. On unravelling, the inner lobule of the smaller (usually the right) lobe is spirally convoluted and shows a smaller petaloid process on its outer side: it is enfolded in the inner lobule of the larger (usually the left) lobe. Finally the outer lobules of each lobe are folded round the inner lobules, so that the whole organ has somewhat the appearance of an opening flower-bud.

The thelycum is shaped somewhat like a reversed W. It consists of a T-shaped plate lying between the penultimate pair of legs, the horizontal limb of the T being thick and prominent, the vertical limb short: from each end of the horizontal limb a salient lamina runs obliquely backwards abutting on the coxæ of the 5th pair of legs.

This species rarely reaches a length of $3\frac{1}{2}$ inches. It is one of the common forms of the 100-fathom line in the muddy parts of the seas that wash the peninsula. It is extremely closely related to *M. philippinensis* Spence Bate, from which it is distinguished, as regards the male by the form of the inner antennular flagellum, and as regards the female by the form of the thelycum.

The collection contains 256 specimens, registered as follows:—

$\frac{4174}{9}$ Type of ♂.	Orissa coast, 68 fathoms.	"Investigator."
$\frac{4206}{9}$ Type of ♀.		
$\frac{4175\text{-}4205}{9}$; $\frac{4207\text{-}30}{9}$		
$\frac{7064\text{-}78}{9}$	Off Masulipatam, 95 fathoms.	
$\frac{7368\text{-}80}{9}$	Off Kalingapatam, 80—100 fathoms.	
$\frac{9120\text{-}30}{9}$	Off Nellore coast, 133—250 fathoms.	
$\frac{9184\text{-}9200}{9}$	Off Madras, 107 fathoms.	
$\frac{1847\text{-}49}{10}$	Off Andamans, 79 fathoms.	
$\frac{3398}{10}$	Off Malabar coast, 68—148 fathoms.	
$\frac{3401}{10}$	Off Canara coast, 124—119 fathoms.	
$\frac{3432}{10}$	Off Concan coast, 56—58 fathoms.	
$\frac{4940}{10}$	G. of Oman, 230 fathoms.	

7*a*. Metapeneus coniger var. andamanensis, Wood-Mason. Plate IV., fig. 13.

Metapenæus philippinensis var. *andamanensis*, Wood-Mason, Ann. Mag. Nat. Hist. (6) VIII. 1891, p. 271: Alcock, Cat. Ind. Deep Sea Crust, 1901, p. 17.

Distinguished by the uptilted and nearly straight rostrum; by the indistinctness of the subcarinæ of the 4th—6th abdominal terga; and by the form of the thelycum. In the thelycum the part corresponding with the vertical limb of the T is a broad, longitudinally-grooved plate, so undermined that all its edges except the anterior limit of attachment are free: its posterior (free) edge is strongly recurved inwards and is bilobed.

The female may attain a length of $5\frac{1}{4}$ inches.

There are 53 specimens in the collection, registered as follows:—

$\frac{2087\text{-}2105}{10}$	Types.	E. of North Andaman I., 185 fathoms.	"Investigator."
$\frac{7381\text{-}85}{9}$		Off Port Blair, Andamans, 112—244 fathoms.	
$\frac{3403}{10}$		Off C. Comorin, 143 fathoms.	
$\frac{3531}{10}$		Andaman Sea, 100 fathoms.	

8. Metapeneus stridulans, Wood-Mason. Plate V., fig. 14, 14*a*-*d*.

Crotalocaris stridulans, Wood-Mason, MS name.
Metapeneus stridulans, Alcock, Ann. Mag. Nat. Hist. (7) XVI. 1905, p. 526.
Peneus velutinus (partim) Spence Bate, Challenger Macrura, 1888, p. 253, pl. xxxiii., fig. 1.

Characterized by the presence, in both sexes, of a pair of stridulating organs, situated one on each side of the carapace, near the middle of the posterior end of the branchiostegite, in such a way that the anterior edge of the 1st abdominal tergum can play over them. Each organ consists of a longitudinal row of vertically-disposed ridges, which vary in number, being usually 5, seldom less than 5, and occasionally as many as 12, or, in the female, more than 12.

The species is a typical *Metapeneus*, and belongs to the same group as *M. philippinensis* and *coniger*.

Integument remarkably thick, hard, and tomentose.

Rostrum nearly straight, uptilted, sometimes reaching to the end of the antennular peduncle but often shorter, armed dorsally with 5—8 teeth, the last of which is small and isolated (epigastric). No post-rostral crest. An indistinct post-ocular denticle. Post-antennular (antennal) spine very strong, produced backwards as a strong convexity defining a broad post-antennular sulcus. Hepatic spine small; cervical groove present only in its neighbourhood. Branchial region not defined except by a short crescentic crease below the hepatic spine. Anterolateral (antero-inferior) angles of carapace spiniform. A pair of

stridulating organs as already defined, which are usually better developed in the female than in the male.

The 2nd abdominal tergum is medially carinated in less than its posterior half, the 3rd in almost all its extent, the carina in both cases being sulcate: the 4th–6th are all sharply carinated, the carina of the 4th and 5th being deeply cleft at its after end. The 6th abdominal somite is nearly twice as long as the 5th, but shorter than the telson. The telson is about as long as the inner caudal swimmeret: it ends very acutely and has, near the apex, 4 pairs of large marginal spines, the last pair being fixed.

Eyes large. Antennular flagella equal, about one-third the length of their peduncle.

The 3rd maxillipeds nearly reach the tip of the antennal scale: the dactylus is slender and is not much shorter than the propodite, with which it articulates end-on: the basis bears an antrorse spine. A similar spine is present on the basis of the 1st two chelipeds and on the ischium of the 1st.

In the female only there is a pair of sternal spines between the 2nd pair of chelipeds.

All the thoracic legs have longish exopodites.

The andricum, which is built in the same way as that of *M. coniger*, is asymmetrical, the left lobe being the longer: the outer lobule of the left lobe ends in a crown of stiffish filaments.

The thelycum consists of the following parts:—(1) between the 5th pair of legs a transverse lamina more or less distinctly divided into three lobes, the outer of which—abutting on the 5th legs—are bluntly dentiform: (2) between the 4th pair of legs a broad transverse plate the anterior part of which shows as a large, smooth, somewhat oval facet: (3) in the interval between the 4th and 5th legs a narrow transverse bar, sinuous and shaped like a very open W.

Large females may attain a length of $3\frac{3}{4}$ inches.

There are 140 specimens in the collection, registered as follows:—

$\frac{4166\text{–}72}{9}$ Types.	Orissa coast, 23—25 fathoms.	"Investigator."
$\frac{9180}{6}$: $\frac{9182}{6}$: $\frac{3513}{10}$: $\frac{5084}{10}$	Andamans, to 20 fathoms.	
$\frac{8567}{9}$: $\frac{5079}{10}$	Ganjam coast, 20—35 fathoms.	
$\frac{5080}{10}$	Vizagapatam coast, 20 fathoms.	
$\frac{5081}{10}$	Madras coast, 31 fathoms.	
$\frac{5082}{10}$	Palk Strait.	
$\frac{5083}{10}$	G. of Martaban, 20 fathoms.	

8446/6		Hongkong.	R. Hungerford.
2075/10	"P. velutinus" Bate.	E. Indian Archipelago.	"Challenger" (British Mus.)

9. METAPENEUS MOGIENSIS, Rathbun. Plate V., fig. 15. 15*a*, *b*.

Parapenæus mogiensis, Rathbun, Proc. U.S. Nat. Mus. XXVI. 1903, p. 39.
Penæus velutinus (partim), Spence Bate, *loc. cit.*

It closely resembles *M. stridulans*, but differs from it in the absence of any stridulating ridges on the carapace, and also in the following particulars:—

The rostrum is shorter, in the male rarely surpassing the middle, in the female rarely surpassing the far end, of the 2nd joint of the antennular peduncle.

The curved subhepatic groove (anterior part of cervical groove) defining the branchial region anteriorly, is more pronounced. The spine (branchiostegal) at the antero-inferior angle of the carapace is much weaker. The 6th abdominal somite is only about half again as long as the 5th.

In the female there is a pair of sternal teeth between the 3rd chelipeds, and between the 2nd chelipeds a pair of teeth, not spines.

The andricum is formed on the same plan as that of *M. coniger* and *M. stridulans*, and though the outer lobule of the left lobe is a little the longer, that of the right lobe is very much the larger: moreover, the outer lobule of the left lobe ends in a slender filament the tip of which is frayed out or denticulate.

The thelycum consists of the following parts:—(1) between the 5th pair of legs two parallel transverse plates one behind the other; the anterior is cut into two laminæ, each of which may again be cut into two teeth; the posterior is cut into three lobes the outer of which are prominent and bluntly dentiform, while the middle one often has a mucronate tip: (2) between the 4th pair of legs a broad sunken plate with a pair of divergent median teeth near its posterior border, the teeth standing in the interval between the two lobes of the anterior of the two plates that lie between the 5th pair of legs. In the young female the most conspicuous part of the thelycum is this last mentioned pair of teeth.

Large females may reach a length of $3\frac{1}{2}$ inches.

The species has been taken in abundance off the Malabar coast, in 28 fathoms; off Ceylon, in 28 and 84 fathoms; and at various places in the Andamans, up to 53 fathoms.

There are 152 specimens in the collection, registered as follows:—

8943/6: 9026/6: 9179/6: 9964/6: 9987/6: 3311/9: 3501/10	Andamans.	"Investigator."

$\frac{2765\text{-}66}{7}$: $\frac{2821\text{-}24}{7}$	Andamans.	G. H. Booley.
$\frac{5077}{10}$	Andamans.	J. Wood-Mason.
$\frac{3279}{9}$: $\frac{5535}{9}$: $\frac{5076}{10}$	Off Ceylon, 34 fathoms.	"Investigator."
$\frac{1129}{10}$	Off Ceylon, 28 fathoms.	
$\frac{5078}{10}$	Off Malabar coast, 28 fathoms.	
$\left[\frac{2075}{10}a\right.$ "P. velutinus" Bate.	E. Indian Archipelago.	"Challenger" (British Mus.)

Parapeneus, S. I. Smith (*sensu restricto*).

Sidney I. Smith, Proc. U. S. Nat. Mus. VIII. 1885, p. 170.

Type: *P. membranaceus* Risso (= *P. longirostris* Lucas.)

Rostrum toothed dorsally only. Antero-inferior angles of carapace usually with, sometimes without, a branchiostegal spine. Post-antennular sulcus defined only ventrally, by the post-antennular (antennal) spine.

A longitudinal suture is generally *present on either side extending from the orbital to the posterior border of the carapace*, and also a vertical suture extending across the branchiostegite at the level of the 2nd pair of chelipeds.

Antennular flagella of moderate length. Endopodite of maxillules (1st maxillæ) abbreviated, unsegmented, the small terminal segment which is present in *Metapeneus* not being differentiated. *No exopodites on any of the thoracic legs.*

Epipodites absent from the 3rd maxillipeds as well as from the last two thoracic appendages. No pleurobranch on the last thoracic somite.

Andricum symmetrical.

The 3rd maxillipeds and last pair of thoracic legs are not known to show any modifications in the male.

The branchial formula is the same as that of *Metapeneus*, but the rudimentary arthrobranch of somite VII (2nd maxillipeds) seems to be absent, and there is no vestigial filament, representing an anterior arthrobranch, on the penultimate thoracic somite.

In addition to the Indian species, I have examined specimens of *P. membranaceus* and *P. serratus*.

Key to the Indian species of the genus Parapeneus.

1. A fine longitudinal suture, extending from the orbital to the posterior border, on either side of the carapace, and a second transverse suture across the branchiostegite at the level of the 2nd pair of chelipeds: telson with a single pair of marginal spines, which are fixed:—

1. A branchiostegal spine: last pair of thoracic legs do not reach the tip of the antennal scale:—
   i. Branchiostegal spine small, placed at the antero-inferior angle of the carapace ... ... *P. fissurus.*
   ii. Branchiostegal spine large, placed some way above and behind the antero-inferior angle of the carapace ... *P. investigatoris.*
2. No branchiostegal spine: last pair of thoracic legs reach a good way beyond the tip of the antennal scale ... ... *P. longipes.*

II. Carapace without sutures: telson with 3 pairs of articulating marginal spines in addition to the fixed pair ... ... *P. rectacutus.*

1. Parapeneus fissurus (Spence Bate). Plate V., fig. 16, 16*a*, *b*.

Penæus fissurus, Spence Bate, Challenger Macrura, p. 263, pl. xxxvi., fig. 1, 1888: Borradaile, Stomatop. and Macrura of Willey's Exped., 1899, pp. 395, 404.

Glabrous, the integument firm but thin.

The rostrum in the female reaches nearly to the tip of the antennular peduncle, but in the male falls short of the middle of its second joint: it has a faint double curve, and is armed dorsally with 6 teeth in addition to a remotely isolated epigastric one: the post-rostral carina is very distinct and is continued almost to the posterior border of the carapace. A small orbital tooth. Post-antennular (antennal) spine strong, its buttress separated from the hepatic spine by a deepish fossa, which is all that represents the cervical groove: post-antennular sulcus rather shallow. A minute branchiostegal spine at the antero-inferior angle of the carapace, produced upwards and backwards as a fine sinuous ridge which ends below the strong hepatic spine, and represents the boundary of the vanished anterior part of the cervical groove.

A very fine suture extends longitudinally on each side, from the orbital almost to the posterior border of the carapace. A similar suture extends transversely across the branchiostegite near the level of the 2nd pair of chelipeds.

The 4th—6th abdominal terga are sharply and thinly carinate in the middle line, each carina ending acutely. The 5th abdominal somite is hardly two-thirds the length of the 6th: the 6th is about as long as the telson: the telson is about as long as the inner caudal swimmeret, and ends in an acicular spine, on either side of which is a fixed marginal spinelet.

The inner antennular flagellum, which is the longer, is from $1\frac{1}{3}$ to $1\frac{1}{2}$ times the length of the peduncle. The eyes are large and surpass the antennular scale.

The external maxillipeds reach into the distal third of the antennal scale: the dactylus articulates end-on with the propodite. There is a spine on the basis, and ischium, of the 1st pair of chelipeds only. No exopodites on any of the thoracic legs.

The andricum is symmetrical: it consists, in the adult, of two lobes finely

interlocking along their anterior border, but not at all in contact along the posterior, ending in an intricate but symmetrical bunch of hooks, teeth, and stiff overlapping lobules.

The thelycum consists of the following parts:—(1) between the 4th pair of legs a broad, smooth, transverse, somewhat semicircular boss; (2) between the 5th pair of legs a pair of teeth or mammillar tubercles; (3) in the interval between the 4th and 5th legs a pair of pyramidal tubercles with often a small sunken tubercle between them.

The female rarely attains a length of 5 inches.

The collection contains 37 specimens, registered as follows:—

7215–16/9	Ganjam coast, 45–50 fathoms.	"Investigator."
1731–32/10 : 4852/10 : 4855/10	G. of Martaban, 67, 61, 46 fath.	
1841–43/10 : 2686/10	Andamans, 55 fathoms.	
2070–71/10	Zebu, Philippines.	"Challenger" (British Mus.)

2. Parapeneus investigatoris, Alc. & And. Plate VI., fig. 17, 17*a-c*.

Parapeneus investigatoris, Alcock and Anderson, Ann. Mag. Nat. Hist. (7) III., 1899, p. 279: Ill. Zool. Investigator, Crust. pl. xli. fig. 1, 1*a*, *b*: Alcock, Cat. Ind. Deep Sea Crust., 1901, p. 18.

Distinguished from *P. fissurus* by the following characters:—

The rostrum in the female does not project much beyond the end of the 1st joint of the antennular peduncle, and in the male does not far surpass the eyes: it has a distinct dorsal convexity. The post-rostral carina fades away at the posterior fourth of the carapace. The branchiostegal spine is as large as the hepatic, and is placed some way behind and above the antero-inferior angle of the carapace: this spine is not connected with any ridge, but a distinct groove (=anterior part of cervical groove) runs in front of it and is then continued backwards, beneath the hepatic spine, to define the anterior part of the branchial region.

The 6th abdominal somite is more than twice as long as the 5th and much longer than the telson: the telson is shorter than the inner caudal swimmeret.

The andricum is like that of *P. fissurus*, but the terminal bunch of teeth and petals is not so intricate.

The thelycum is built on the same plan: it consists of a transverse semicircular plate between the 4th legs, supported by two lateral pillars which abut on the 5th pair of legs; between the pillars, posteriorly, is a median tubercle, and the whole organ encloses a fossa which is shaped much like a figure of eight.

There are 21 specimens in the collection, registered as follows:—

9181-83/9	Off Pulicat, 133 fathoms.	"Investigator."
808-809/10	G. of Manár, 180-217 fathoms.	
2080-86/10 Types.	Andaman Sea, N.E. of North I., 185 fathoms.	
2596-2604/10	Andaman Sea, N. of North I., 370-419 fathoms.	

3. Parapeneus longipes, Alcock. Plate VI, fig. 18, 18*a*, *b*.

Parapeneus longipes, Alcock, Ann. Mag. Nat. Hist. (7) XVI. 1905, p. 525.

Resembles *P. fissurus*, from which it is distinguished by the following characters:—

The rostrum in both sexes barely reaches the end of the first joint of the antennular peduncle. There is *no trace of a branchiostegal spine* at the antero-inferior angle of the carapace.

The inner (longer) antennular flagellum is about as long as its peduncle in the female, and a little longer in the male.

The 3rd or external maxillipeds reach the tip of the antennal scale, and the last pair of thoracic legs reach a dactylus-length beyond them.

The andricum is formed on the same plan, but ends in a pair of (median) ragged petaloid lobes, and a pair of (lateral) stiff, curved, hornlike filaments.

The thelycum consists of a broad, longitudinally-grooved plate occupying all the space between the 5th pair of legs, articulating with a horse-shoe-shaped, or concave semicircular plate lying between the 4th pair of legs.

The female attains a length of $3\frac{1}{4}$ inches.

The collection now numbers 121 specimens, registered as follows:—

1678-79/7 Types.	Off Ganjam coast, 35 fathoms.	"Investigator."
4055-59/9 : 4232-33/9 : 7112-7200/9 : 4702/9	Ganjam and Vizagapatam, 7-35 fathoms. Mangalore (Malabar coast) 26-31 fathoms.	
7925/9	Sandheads, R. Hooghly.	Bengal Pilot Service.

4. Parapeneus rectacutus, Spence Bate. Plate VI, fig. 19, 19*a*, *b*.

Penæus rectacutus, Spence Bate, Challenger Macrura, p. 266, pl. xxxvi, fig. 2, 1888. *Metapencus rectacutus*, Wood Mason, Ann. Mag. Nat. Hist. (6) VIII, 1891, p. 274. *Parapeneus rectacutus*, Ill. Zool. Investigator, Crust. pl. xlix. fig 5: Alcock, Cat. Indian Deep Sea Crust., 1901, p. 17.

Differs from *P. fissurus* in the following particulars:—

The rostrum in the female reaches the tip of the antennular peduncles, and

in the male the far end of their 2nd joint: in addition to the small isolated epigastric spine it has 11 to 13 dorsal teeth. There is no post-rostral carina behind the gastric region. No orbital tooth. Post-antennular spine moderate, its buttress indistinct. A strongish branchiostegal spine at the antero-inferior angle of the carapace. The deep-cut cervical groove is continued right up to the branchiostegal spine, and the ridge defining this anterior part of the cervical groove is continued backwards in a sinuous course to the posterior border of the carapace, thus forming a prominent boundary to the entire branchial region. Hepatic spine moderate: the subhepatic groove (posterior branch of cervical groove) is almost as well marked as the hepatic fossa. *There are no sutures on the carapace.*

The 6th abdominal somite is nearly twice as long as the 5th. On the telson there are 3 pairs of (distant) marginal spinelets in addition to the fixed pair.

In the female the antennular flagella are a little longer than the peduncle: in the male the outer flagellum is nearly twice this length, and the shorter inner flagellum has its base looped in a stiff semicircle, the distal end of the loop ending in a recurved tooth.

The andricum is symmetrical and is of the same open-pod-shaped form seen in the species of *Peneus* proper. It consists of two lobes, finely interlocking along their anterior edge only, and having the opposed surfaces concave.

The thelycum consists of a transverse, heart-shaped or semicircular lobe lying between the 4th pair of legs, and a pair of lateral somewhat ear-shaped lobes abutting on the 5th pair of legs.

The female may reach a length of $5\frac{1}{2}$ inches.

The collection includes 76 specimens, registered as follows:—

$\frac{9131\text{–}80}{9}$	Off Pulicat (Madras) 133, and 145–250 fathoms.	"Investigator."
$\frac{6730\text{–}31}{9}$	S. of Port Blair, Andamans, 188–220 fathoms.	
$\frac{2589\text{–}95}{10}$	N. of North Andaman I., 370–419 fathoms.	

Parapeneopsis Wood-Mason MS.

Alcock, Cat. Indian Deep Sea Crust., 1901, p. 14.
Type: *P. stylifera*, Edw.

Rostrum toothed dorsally only. Antero-inferior angles of carapace sharp or dentiform. Post-antennular sulcus defined only ventrally.

Carapace with longitudinal and transverse sutures as in most *Parapenei*, but the longitudinal suture never reaches the posterior border.

Antennular flagella either long or short. Endopodite of maxillules (1st

maxillæ) short, unsegmented. Petaloid exopodites are present on all the thoracic legs.

Epipodites absent from the 3rd maxillipeds as well as from the last three thoracic appendages; sometimes absent from *all* the legs. No pleurobranchiæ on the last two thoracic somites.

Andricum symmetrical. The 3rd maxillipeds and 5th pair of legs are not known to be modified in the male.

The branchial formula is:—

Somite	Podobranchiæ	Arthrobranchiæ	Pleurobranchiæ		Total
VII	ep.	0 (or *r*)	0	=	ep. *r*?
VIII	ep. + 1	2	0	=	ep + 3
IX	0	2	1	=	3
X	(ep.) 0	2	1	=	(ep.) + 3
XI	(ep.) 0	2	1	=	(ep.) + 3
XII	0	2	1	=	3
XIII	0	1	0	=	1
XIV	0	0	0	=	0
Total ...	½ ep. + 1	11 (+ *r*?)	4	=	½ ep. + 16 (+*r*?)

The vestigial arthrobranch of somite VII is often absent.

Key to the Indian species of the genus Parapeneopsis.

I. Epipodites on 2nd maxillipeds and first two pairs of chelipeds: the usual isolated epigastric tooth of the rostral carina present:—

1. Outer antennular flagellum as long as the carapace (without rostrum): the subhepatic ridge defining the anterior part of the cervical groove is continued to the tip of the branchiostegal tooth: telson with strong lateral marginal spines ... ... *P. stylifera.*

2. The subhepatic ridge does not run on to the branchiostegal tooth: only rarely does the telson have an obscure lateral marginal spine:—

i. Outer antennular flagellum as long as its peduncle ... *P. sculptilis.*

ii. Antennular flagella shorter than the peduncle:—

a. Postrostral carina continued to posterior border of carapace:—

α. Carina canaliculate: spine on basis of 2nd pair of chelipeds indistinguishable ... *P. uncta.*

β. Carina sharp: spine on basis of 2nd pair of chelipeds very strong: in females there is also a spine on the basis of the 3rd pair of chelipeds ... ... *P. maxillipeda.*

b. The postrostral carina fades away far in advance of the posterior border of the carapace: antennular flagella about a third the length of the peduncle... *P. nana.*

II. Epipodites present on the 2nd maxillipeds only: no postrostral carina and no isolated epigastric spine ... ... *P. acclivirostris.*

1. Parapeneopsis stylifera (Edw.) Plate VII., fig. 21.

Penæus styliferus, Milne Edwards, Hist. Nat. Crust., II., p. 418.
? Miers, P.Z.S. 1878, p. 304. *Penæopsis styliferus*, Spence Bate., Ann. Mag. Nat. Hist. (5) VIII., 1881, p. 183.
Parapenæopsis styliferus, Nobili, Boll. Mus. Torino, XVII, 1903, No. 452, p. 4, fig. 4.

Integument firm and strong: carapace finely punctate.

Rostrum with a strong double curve; its proximal curve bearing a crest of 7 to 9 teeth (not including the isolated epigastric tooth), its distal curve styliform: though longer in the female, it in both sexes projects beyond the tip of the antennular peduncle. The postrostral carina extends nearly to the posterior border of the carapace: it may be facetted here and there, but is not canaliculate. A post-ocular tooth. A strong post-antennular (antennal) spine, the buttress of which is produced backwards to the hepatic fossa: post-antennular sulcus shallow. Antero-inferior angles of the carapace broadly spiniform, the crest of the spine being continued backwards as a sinuous ridge (defining the anterior part of the cervical groove) to a point someway behind the smallish hepatic spine. Dorsal of the hepatic spine the cervical groove is hardly distinguishable.

The carapace is cut, on either side, by a fine longitudinal suture which runs from the orbit to the after limit of the gastric region: a similar short transverse suture extends across the branchiostegite at the level of the 3rd pair of legs.

The 4th-6th abdominal terga are sharply carinated in the middle line: it requires some imagination to see a blunt median carina on the 2nd and 3rd terga also. The 5th abdominal somite is about two-thirds the length of the 6th, the 6th is more than two-thirds the length of the telson. The telson is nearly as long as the inner caudal swimmeret, is longitudinally grooved in almost all its dorsal extent, ends very acutely, and is armed on either side with very distinct fixed marginal spinelets.

Antennular flagella about as long as the carapace without the rostrum, the outer slightly the longer.

The external maxillipeds, which are coarse, fall a good deal short of the middle of the antennal scale. Their dactylus is slender and articulates end-on with the propodite.

A basal spine is present on the first two pairs of chelipeds only. The 5th pair of legs reach into the distal third of the antennal scale. All the thoracic legs have petaloid exopodites.

Andricum symmetrical, simple: it consists of two lobes finely interlocking all along their anterior edge, and simply apposed along their posterior edge: its distal angles are produced into a pair of longish horn-like filaments.

The thelycum consists of three squarish-cut lobes, a large, concave, median

one, lying between the 4th pair of legs, and fitting by means of a short stem between a pair of smaller lateral ones lying between the 5th pair of legs.

This species attains a length of $4\frac{1}{2}$ inches.

There are 59 specimens in the Museum collection, registered as follows :—

4422–23/9	Malabar coast.	F. Day.
4432–39/9		No history.
381–90/10 : 392–99/10 : 441–55/10 : 461–70/10	Palk Strait.	"Investigator."
2065/10	Karáchi.	British Museum.

1*a*. Parapeneopsis stylifera var. coromandelica Plate VII., fig. 20, 20*a-c*.

In this variety the marginal spines of the telson are reduced to a large pair, and occasionally a second minute pair, at the base of the terminal spine, this condition being constant in both sexes and at different ages.

The collection includes 72 specimens of this variety, registered as follows :—

1283/7 : 7347–50/9	Sandheads, R. Hooghly.	J. Rust and A. J. Milner.
4067–77/9 : 7306–46/9 : 7351–53/9	Orissa and Vizagapatam.	"Investigator."
4420–21/9	Colombo.	J. Anderson.
4424–31/9	Madras.	Purchased.

2. Peneopsis sculptilis, Heller. Plate VII., fig. 22, 22*a-d*.

Penæus sculptilis, Heller, Verh. zool.-bot. Ges. Wien, XII. 1862, p. 528, and Novara Crust. p. 122, pl. xi. fig. 1, 1865 : Miers, Ann. Mag. Nat. Hist. (5) V. 1880, p. 457 : deMan, Journ. Linn. Soc., Zool., XXII. 1888, p. 286 : Henderson, Trans. Linn. Soc. (2) V. 1893, p. 448 : Nobili, Boll. Mus. Torino, XVI. 1901, No. 397, p. 2, and XVIII. 1903, No. 452, p. 5 (*Parapenæopsis*).

This species differs from *P. stylifera* in the following particulars :—

The rostrum, though of the same shape, is often shorter, in some cases (not, as far as can be seen, the result of breakage) not reaching the tip of the antennular peduncle; often, in the adult male, the styliform part is lost, and the rostrum then reaches only to the middle of the peduncle. The post-rostral carina is distinctly canaliculate. The buttress of the post-antennular spine is not so strong, and does not reach the hepatic fossa.

The sinuous sub-hepatic ridge, defining the anterior part of the cervical groove, is not continued to the tip of the branchiostegal tooth : this is quite diagnostic in comparison with *P. stylifera*.

The longitudinal suture of the carapace is continued some way behind the gastric region.

The median carination of the 2nd and 3rd (especially of the 3rd) abdominal terga is, though not striking, quite distinct.

The telson as a rule, though not always, is shorter, being often not much longer than the 6th somite; its dorsal longitudinal groove is shorter; and as a rule, to which in 118 perfect specimens I find only 4 exceptions, it has no lateral marginal spines.

The antennular flagella are but little longer than their peduncle. The external maxillipeds reach the middle of the antennal scale.

The andricum consists of two compressed lobes, in contact all along their inner border, the outer border being scalloped into three lobules—a broad, semicircular basal one, a long and narrow median one, and a small, recurved, petaloid one: from its distal end spring a pair of wing-like lobules, the posterior surface of which is deeply channelled.

The thelycum consists of a large hexagonal or leaf-shaped plate, lying between the 4th pair of legs and broadly articulating with a transverse plate, the outer edges of which are notched, placed between the 5th pair of legs.

This species reaches a length of $5\frac{1}{2}$ inches.

There are 135 specimens in the Indian Museum, registered as follows:—

$\frac{7712}{6}$: $\frac{7720}{6}$: $\frac{7722}{6}$: $\frac{7268}{9}$: $\frac{4409\text{–}11}{9}$: $\frac{3394\text{–}95}{10}$	G. of Martaban.	"Investigator."
$\frac{3831\text{–}34}{9}$	Off Cochin coast.	
$\frac{4091\text{–}95}{9}$: $\frac{7245\text{–}50}{9}$: $\frac{5086}{10}$	Orissa and Ganjam.	
$\frac{4419}{9}$	Dumra R., Orissa.	
$\frac{471\text{–}72}{10}$	Palk Strait.	
$\frac{1158}{10}$	Bombay.	
$\frac{8153}{6}$	Mergui.	J. Anderson.
$\frac{4400}{9}$: $\frac{4443}{9}$	Penang.	F. Stoliczka.
$\frac{4441\text{–}2}{9}$: $\frac{7261\text{–}67}{9}$	Sandheads, Hooghly R.	F. Day and A. J. Milner.
$\frac{4500\text{–}34}{9}$	Bombay.	Purchased.
$\frac{4873\text{–}80}{9}$	Hongkong.	G. Dennys.

2*a*. Parapeneopsis sculptilis var. Hardwickii (Miers).

Pœus Hardwickii, Miers, P.Z.S., 1878, p. 300, pl. xvii. fig. 1.

In this variety the andricum is more slender, and the median plate of the thelycum has the shape of a vertical section of a mushroom. In addition, the obscure median carination of the first two abdominal terga is absent.

There are 68 specimens in the collection, registered as follows:—

$\frac{4070\text{–}90}{9}$: $\frac{7268\text{–}7305}{9}$: $\frac{7354\text{–}58}{9}$	Orissa and Ganjam.	"Investigator."
$\frac{4412\text{–}18}{9}$	Madras and Pondicherry.	Purchased.

2*b*. Parapeneopsis sculptilis var. cultrirostris. Plate VII, fig. 23.

In this variety, which may be merely another form of the male, the rostrum is straight and nearly horizontal, does not reach further than the middle of the 2nd joint of the antennular peduncle, and has a peculiar dagger shape. Only males are known.

The collection includes 13 perfect specimens, registered under the following numbers:—

$\frac{4060\text{–}66}{9}$: $\frac{7237\text{–}44}{9}$	Orissa and Ganjam.	"Investigator."
$\frac{4474}{9}$	Sunderbunds, Hooghly R.	F. Day.

3. Parapeneopsis uncta, Alcock. Plate VIII., fig. 25, 25*a*.

Parapeneopsis uncta, Alcock, Ann. Mag. Nat. Hist. (7) xvi. 1905, p. 528.

Compared with *P. stylifera* this species exhibits the following points of difference:—

The integument is even thicker and denser, and though sparsely punctate has a polished greasy appearance.

The rostrum has but a faint double curve and, owing to the absence of any styliform prolongation, reaches only to the middle of the 2nd joint of the antennular peduncle in both sexes.

The antero-inferior angles of the carapace are sharply rectangular, not spiniform or dentiform.

As in *P. sculptilis* the post-rostral carina is canaliculate, and the sinuous subhepatic ridge (defining the anterior portion of the cervical groove) does not reach the antero-inferior angle of the carapace.

Dorsal of the hepatic spine the cervical groove is very distinct up to the longitudinal suture of the carapace, this being a quite distinctive feature.

The longitudinal suture of the carapace runs nearly to the level of the transverse suture.

The 6th abdominal somite is as long as the telson: the telson is very short, not reaching the middle of the inner caudal swimmeret, and is without marginal spinelets.

The antennular flagella are equal and a little shorter than their peduncle.

The 3rd maxillipeds nearly reach the middle of the antennal scale and surpass the tips of the 5th thoracic legs

The spine on the basis of the 1st chelipeds is very slender, and that on the 2nd chelipeds is not distinguishable.

The andricum, like that of *P. sculptilis*, has on each outer margin a wing-like basal lobule, beyond which it simply tapers to end in four hooks, of which the anterior pair are small and are concealed by the posterior pair in the flexed position of the organ.

The thelycum consists of a square plate between the 5th pair of legs, and a semicircular one between the 4th.

Four specimens, registered as follows:—

$\frac{7359\text{–}60}{9}$: $\frac{5088}{10}$ Types. Ganjam coast. "Investigator."

4. Parapeneopsis maxillipedo, Alcock. Plate VIII., fig. 24, 24*a*, *b*.

? *an Penæus cornutus*, Kishinouye, Journ. Fish. Bureau, Tokyo, VIII. 1903, i. p. 23. Alcock, Ann. Mag. Nat. Hist. (7) xvi. 1905, p. 527.

Compared with *P. stylifera* it presents the following differences:—

The dorsal half of the carapace is tomentose. The rostrum is recurved at tip but otherwise is nearly horizontal, it does not reach the end of the antennular peduncle in either sex, and it is armed dorsally with 8-10 teeth (not including the isolated epigastric tooth) which form a very decided crest. The post-rostral carina, which is continued right up to the posterior border of the carapace, is sharp and particularly prominent.

The antero-inferior angles of the carapace are merely dentiform: the sinuous subhepatic ridge (defining the anterior part of the cervical groove) stops far short of the antero-inferior angle of the carapace.

The longitudinal fissure of the carapace extends only a short way behind the level of the hepatic spine.

The telson is short and has no marginal spinelets.

The antennular flagella, which are equal, are about two-thirds the length of their peduncle.

All the joints of the 3rd maxillipeds, except the dactylus, are abnormally broad, coarse, and tomentose.

The 5th pair of thoracic legs reach only to the middle of the antennal scale. The basal spines of the chelipeds are big, and in the female there is one on the 3rd chelipeds as well as on the 1st and 2nd.

The andricum has, on its outer edges, the same basal wing-like lobule as that of *P. sculptilis*, but the organ ends in a pair of long calipers.

The thelycum is concave and three-lobed: the middle lobe is very large and leaf-like; the lateral lobes, lying between the 5th pair of legs, are small, and have between them, in the middle line, a globous tubercle, behind which is a thick tuft of long setæ.

This species attains a length of $4\frac{1}{2}$ inches. It may turn out to be Kishinouye's *P. cornutus*, a Japanese species also recorded by Nobili from Bombay.

The Museum collection includes 12 specimens, registered as follows:—

$\frac{4462}{9}$	Type of male.	Arakan coast.	"Investigator."
$\frac{4466\text{–}73}{9}$	Types of female.	Madras.	Purchased.
$\frac{5087}{10}$		Bombay.	"Investigator."

5. Parapeneopsis nana, Alcock. Plate VIII., fig. 26, 26*a*, *b*.

Parapeneopsis nana, Alcock., Ann. Mag. Nat. Hist. (7) xvi. 1905, p. 529.

Compared with *P. stylifera* it shows the following differences:—

The rostrum, though in all respects similar, is shorter, so that its styliform portion does not quite reach the end of the antennular peduncle. The post rostral carina fades away at the posterior fourth of the carapace.

The antero-inferior angle of the carapace is sharp-cut but not spiniform and the sinuous subhepatic ridge, defining the anterior part of the cervical groove, falls far short of it.

The telson is generally shorter than the 6th abdominal somite; its median dorsal groove is short and shallow, and it has no lateral marginal spinelets.

The antennular flagella, which are equal, are about one-third the length of their peduncle. The 5th pair of legs reach only to the middle of the antennal scale.

The andricum is slender and ends in a pair of long, straight, stiff filaments, which stand out at right-angles to the rest of the organ.

The thelycum resembles that of *P. sculptilis*, its most conspicuous part being a large leaf-shaped median plate lying between the 4th pair of thoracic legs.

This is a small species, the largest female being only $2\frac{1}{4}$ inches long: males of still smaller size appear, from the structure of the andricum, to be adult.

The collection contains 16 specimens, registered under the following numbers:—

$\frac{2359}{7}$: $\frac{7205\text{–}12}{9}$	Types of female.	Ganjam coast.	
$\frac{7213\text{–}14}{9}$	Types of male.	Ganjam coast.	"Investigator."
$\frac{4078}{9}$		Orissa coast, 68 fathoms.	
$\frac{4445\text{–}47}{9}$		Madras.	Purchased.

6. Parapeneopsis acclivirostris, Alcock. Plate VIII., fig. 27, 27*a*.

Parapeneopsis acclivirostris, Alcock, Ann. Mag. Nat. Hist. (7) xvi. 1905, p. 530.

an Penæus tenellus, Spence Bate, Challenger Macrura, p. 270, 1888: Kishinouye, Journ. Fish. Bur. Tokyo. VIII. I. 1900, p. 22, pl. vi. fig. 3, pl. vii. fig. 8, 8*a*, *b*.

This small species is quite peculiar among Indian *Penei* in not having epipodites on any of the thoracic legs, nor any isolated epigastric tooth behind the rostrum. In the latter respect it resembles *Penæus tenellus* of Spence Bate and Kishinouye and *Penæus crucifer* of Ortmann.

Compared with *P. stylifera* it exhibits the following points of difference:—

The rostrum, in the female, though recurved at tip, is nearly straight and uptilted: it may reach or may fall short of the end of the antennular peduncle: it has 7 teeth and is not produced as a carina behind the gastric region.

The antero-inferior angle of the carapace is sharp-cut but not spiniform, and the subhepatic ridge, defining the anterior part of the cervical groove, stops far short of it and is elegantly ciliated.

The longitudinal suture of the carapace reaches some way behind the gastric region.

The 6th abdominal somite is as long as the telson, which is short and has no marginal spinelets.

The antennular flagella are equal and are not much more than half the length of their peduncle.

The external maxillipeds and 5th pair of legs reach nearly to the middle of the antennal scale.

The thelycum consists of a concave semicircular plate lying between the 4th pair of legs, and a squarish plate occupying the space between the 5th pair of legs. All our specimens, 34 in number, are females.

$\frac{4449-55}{9}$		Madras.	Purchased.
$\frac{7201-4}{9}$		Ganjam and Vizagapatam.	"Investigator."
$\frac{400}{10}$		Palk Strait.	
$\frac{736}{10}$	Types.	Persian Gulf.	F. W. Townsend.

Trachypeneus, Alcock.

Alcock, Cat. Indian Deep-Sea Crust., 1901, p. 15.

Type: *T. curvirostris* Stimpson (= *T. anchoralis* Spence Bate).

Rostrum toothed dorsally only. Antero-inferior angles of carapace fairly well pronounced. Post-antennular sulcus defined only ventrally.

Carapace with longitudinal and transverse sutures, but the former is very short, existing only in the orbital region.

Antennular flagella short. Endopodite of maxillules short, unsegmented. Petaloid exopodites are present on all the thoracic legs.

Epipodites absent from 3rd maxillipeds, as well as from the last two thoracic appendages. No pleurobranchiæ on the last two thoracic somites.

Andricum symmetrical. The 3rd maxillipeds and last thoracic legs are not known to be modified in the male.

The branchial formula is:—

Somite	Podobranchiæ	Arthrobranchiæ	Pleurobranchiæ		Total.
VII	ep.	0	0	=	ep.
VIII	ep.+1	2	0	=	ep.+3
IX	0	2	1	=	3
X	ep.	2	1	=	ep.+3
XI	ep.	2	1	=	ep.+3
XII	ep.	2	1	=	ep.+3
XIII	0	1	0	=	1
XIV	0	0	0	=	0
Total	5 ep.+1	11	4	=	5 ep.+16

In addition to the Indian species, I have examined specimens of *T. curvirostris* (= *T. anchoralis*) and *T. constrictus*.

1. Trachypeneus asper Alcock. Plate IX, fig. 28, 28*a*, *b*.

Trachypeneus asper, Alcock, Ann. Mag. Nat. Hist. (7) xvi. 1905, p. 531.

Integument very thick and hard, tomentose, finely scabrous.

Rostrum quite straight, uptilted, strongly so in the female, not reaching the end of the 2nd joint of the antennular peduncle: dorsally it is armed with 9 or 10 teeth (not including the isolated epigastric tooth) which form a crest.

Post-rostral carina low, broad and faint; nearly reaching the posterior border of the carapace. An orbital spine. A strong post-antennular (antennal) spine, the buttress of which reaches the hepatic fossa. A fine suture runs along the anterior part of the floor of the shallow post-antennular sulcus. A similar transverse suture is seen on the branchiostegite, at the level of the 3rd pair of chelipeds. Hepatic spine rather small. Antero-inferior angles of carapace distinctly dentiform. A very indistinct subhepatic groove (the anterior part of the cervical groove) runs from the base of the post-antennular buttress to the base of the hepatic spine: dorsal of the hepatic spine the groove cannot be distinguished.

On the 2nd abdominal tergum there is a median compressed tubercle. The 3rd—6th terga are very sharply carinated. The 5th abdominal somite is about two-thirds the length of the 6th, the 6th is about as long as the telson. The telson, which is dorsally grooved, is much shorter than the inner caudal swimmeret, ends rather abruptly, and has, on either side, a very obscure subterminal marginal spinelet as well as two hardly perceptible lateral spinules.

The antennular flagella of the male are about three-fourths, those of the female about two-thirds, the length of their peduncle: the lower flagellum is much the coarser. The 3rd maxillipeds are coarse, except the dactylus, and reach into the anterior third of the antennal scale. The last pair of thoracic legs reach at least a dactylus-length beyond the tip of the antennal scale. A basal spine is present on the first two pairs of chelipeds. All the thoracic legs have petaloid exopodites.

The andricum is anchor-shaped.

The thelycum consists of a transverse bar between the 5th pair of legs and a concave semilunar plate between the 4th.

The female reaches a length of $3\frac{3}{4}$ inches. The colours in life are pink, the abdominal carinæ and thoracic appendages being milk white.

It differs from *T. curvirostris* Stimpson (= *T. anchoralis* Spence Bate), of which we have both "Challenger" specimens from Japan and other specimens from Hongkong, in the following particulars:—

The rostrum is quite straight and has more teeth, and the post-rostral carina is much fainter.

The antero-inferior angles of the carapace are sharper, and the anterior part of the cervical groove is much less distinct.

The antennules are shorter, both in their peduncle and in their flagella; and the 5th pair of legs are longer.

Though the andricum and thelycum are much alike, specimens of the same size being compared, yet they differ a good deal in detail.

There are 10 specimens in the collection, registered as follows :—

$\frac{4054}{9}$: $\frac{7220}{9}$	Types of male.	Ganjam coast, 23–26 fathoms.	"Investigator."
$\frac{7218\text{–}19}{9}$: $\frac{1680}{7}$	Types of female.	Ganjam coast, 20–35 fathoms.	
$\frac{3474}{10}$		Andamans, 60 fathoms.	
$\frac{5089}{10}$		Persian Gulf.	W. T. Blanford.

Atypopeneus, Alcock.

Atypopeneus, Alcock, Ann. Mag. Nat. Hist. (7) xvi. 1905, p. 524.

Rostrum toothed dorsally only. Antero-inferior angles of carapace rectangular. Post-antennular sulcus not defined at all. No longitudinal or transverse carapacial sutures.

Antennular flagella much longer than the carapace. Endopodite of maxillules *slender*. Filamentous exopodites on all the thoracic legs.

Epipodites absent from 3rd maxillipeds and last two pairs of thoracic legs. No pleurobranchiæ on the last two thoracic somites.

The andricum is symmetrical.

Type *Peneus compressipes*, Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 450, pl. xl. fig. 21, 22.

As Henderson surmised, this is a unique form and is worthy of a separate position.

This genus or section includes, at present, only Henderson's *Peneus compressipes;* but two of Stimpson's species from Hongkong, viz., *P. podophthalmus* and *P. stenodactylus*, may possibly be assigned to it.

Atypopeneus compressipes, Henderson. Plate IX. fig. 29, 29*a*.

Penæus compressipes, Henderson, Trans. Linn. Soc. Zool., (2) V. 1893, p. 450, pl. xl. fig. 21, 22.

Rostrum short, only slightly surpassing the eyes; armed dorsally with 8 teeth, and continued as a carina almost to the posterior border of the carapace: the carina bears an isolated epigastric tooth, *which is placed unusually far back.* No post-ocular spine. The post-antennular (antennal) spine is small and has no buttress, so that there is *no post-antennular sulcus.* The cervical groove is present only in the immediate neighbourhood of the hepatic spine, and is there not very distinct.

The 4th-6th abdominal terga are carinated in the middle line, and there are traces of a carina on the 3rd also. Telson short, without lateral marginal spines.

Eyes rather small, with *slender stalks.* Antennular peduncles slender,

longer than the antennal scales: antennular flagella subequal, longer than the carapace and rostrum.

The external maxillipeds reach nearly to the tip of the antennal scale. First four pairs of legs rather short, with the merus and carpus broad and compressed: the 2nd and 3rd chelae have long and slender fingers. The legs of the last pair are long and slender. All the thoracic legs have slender compressed exopodites.

The andricum is symmetrical and ends in a pair of short slightly incurved horns.

A male $1\frac{2}{5}$ in. long and apparently adult, from off the Madras coast, 12 fathoms: No. $\frac{5090}{10}$.

TABLE OF THE GENERA AND SPECIES OF THE PENEUS GROUP.

The names of Indian genera and species are printed in small capitals.

I. Genus PENEUS, Fabr. *sensu restricto.*

i. Species in which the antennular flagella are extremely short; a small post-ocular spine and crest (in addition to the large post-antennular spine and crest) are present on the anterior part of the carapace; and the telson is armed with lateral marginal spines:—

1.	*P. caramote* Risso.	*Caramote*, Rondelet, 1555. *Alpheus caramote*, Risso Crust. Nice, p. 90, 1816. *Penæus caramote*, Desmarest, Consid. Gén. Crust., p. 225, 1825: Risso, Hist. Nat. Europ. Mérid., V. p. 67, 1826: Milne Edwards in Cuvier, Règne Anim. pl. L fig. 1, and Hist. Nat. Crust. II. p 413, 1837: Lucas, Hist. Nat. Anim Art. in Expl. Sci. Algèrie, Zool. I. i. p. 46, 1849: Bell, Brit. Stalkeyed Crust. p. 318, 1853: Heller, Crust. südl. Europ., p. 294, 1863: Brocchi, Ann. Sci. Nat. Zool. (6) II. 1875, Art. 2, p. 33: Mayer, Mitth. Zool. Sta. Neap. I. 1879, p. 49: Carus, Prodr. Faun. Medit. I. p. 471, 1885: Ozorio, Jorn. Sci Lisb. XI. 1885–87, p. 230: List, Mitth. Zool. Sta. Neap. XII. 1897, p. 74, pl. iv. fig. I, 2, 4, pl. v. fig. 25: Doflein SB. bayer. Akad. München, 1900, p. 126. *Palæmon sulcatus*, Olivier, Encycl. Méthod. VIII. 1811, p. 661. *Peneus trisulcatus*, Leach, Trans. Linn. Soc. XI. 1815, p. 347, and Malac. Pod. Brit. pl. xlii, 1815: Desmarest, Consid. Gén. Crust., p. 225, pl. xxix. fig. 3.	Mediterranean: England (St. George's channel): W. coast S. Africa.
2.	P. CANALICULATUS, Oliv.	*Ante.*	Red S., and E. Africa to Sandwich Is.
2*a*.	„ „ var. JAPONICUS Bate.	*Ante.*	India: Japan.
2*b*.	„ „ var. *australiensis*, Bate.	*Ante.*	Sydney.
3.	*P. brevirostris*, Kingsley.	Proc. Acad. Nat. Sci. Philadelphia, XXX. 1878, p. 98.	W. coast Nicaragua.
4.	*P. californiensis*, Holmes.	Occas. Papers Californian Acad. Sci. VII. 1900, p. 218.	San Francisco Bay.
5.	*P. latisulcatus*, Kishinouye.	Journ. Fish. Bur. Tokyo, VIII. i. 1900, p. 12, pl. ii. fig. 2, pl. vii. fig. 2, 2*a*.	Japan.

ii. Antennular flagella extremely short: a small postocular spine and crest: no marginal spines on telson:—

6.	*P. brasiliensis*, Latr.	Latreille, Nouv. Dict. d'Hist. Nat. XXV. p. 256, 1817: Milne Edwards, *op. cit.*, p. 414: Gibbes, Proc. Amer. Ass. 1850, p. 198: Martens, Arch. f. Nat. 1872, p. 140: S. I. Smith, Rep. U. S. Fish. Comm. 1872–73, p. 642, and Trans. Connect. Acad. IV. 1880, p. 267: Stimpson, Ann. Lyc. Nat. Hist. N. York, X. 1874, p. 132: Miers, P.Z.S., 1878, p. 299, and Ann. Mag. Nat. Hist. (5) VIII. 1881, p. 367: Kingsley, Proc. Acad. Philad. 1878, p. 330: Spence Bate, Ann. Mag. Nat. Hist. (5) VIII. 1881, p. 175: Ortmann, Zool. Jahrb., Syst. V. 1890, p. 449, pl. xxxvi. fig. 1*a-b*: Benedict, P.U.S. Nat. Mus. 1893, p. 540: Rathbun, Ann. Inst. Jamaica, No. 1, 1897, p. 46, and Bull. U. S. Fish. Comm. II. 1900, p. 100: Doflein, SB. bayer. Ak. München 1899, p. 185: Verrill, Trans. Conn. Acad. X. 1899–90, p. 580: Moreira, Arch. Mus. Rio Janeiro, XI. 1901, p. 6.	New York to Pernambuco: Africa (Senegambia and Gold coast.)

iii. Antennular flagella shorter than their peduncle: no postocular spine and crest: no marginal spines on telson.

7.	P. MONODON, Fabr.	*Ante.*	Red S. and E. Africa to Japan and Australia.
8.	*P. setiferus*, L.	*Cancer setiferus*, Linn. Syst. Nat. ed. xii. p. 1054, 1767: Herbst, Krabben, II. 1791, p. 106, pl. xxxiv. fig. 3. *Penæus setiferus*, Milne Edwards, *l.c.*: Heller, Novara Crust. 1865, p. 121: Martens, Arch. f. Nat. 1872, p. 141: Stimpson, Ann. Lyc. Nat. Hist. N. York, X. 1874, p. 133: Miers, P.Z.S., 1878, p. 307: Kingsley, Proc. Acad. Philad. 1878, p. 330: Rathbun, Ann. Inst. Jamaica, 1897, p. 45: Doflein, SB. bayer Ak. München, 1900, p. 126: Moreira, Arch. Mus. Rio Janeiro, 1901, p. 7. *Penæus fluviatilis*, Say, Journ. Acad. Philad. 1817, p. 236.	Virginia to Pernambuco.

iv. Antennular flagella longer than their peduncle: no postocular spine and crest: no marginal spines on telson:—

9.	P. INDICUS Edw.	*Ante.*	E. Africa to China.
9*a*.	„ „ var. MERGUIENSIS de Man.	*Ante.*	India; Java.
9*b*.	var. PENICILLATUS W.-M.	*Ante.*	India.
10.	*P. stylirostris*, Stimpson.	Ann. Lyc. Nat. Hist. N. York, X. 1871, p. 134: Kingsley Bull. Essex Inst. X p. 70: Miers, P.Z.S., 1878, p. 301. According to Miers = *indicus* Edw., but this, I think, is doubtful.	Panama.
11.	*P. occidentalis*, Streets.	Proc. Acad. Philad. 1871, p. 242: Miers, Zool. H.M.S., Alert, 1885, p. 564. According to Miers = *stylirostris*, which, I think, is probable.	Panama.

v. Species having no exopodite on the last pair of thoracic legs; in other respects agreeing with section iv:—

12.	P. SEMISULCATUS, De Haau.	*Ante.*	Red S. and E. Africa to Australia, Japan, and Fiji and Tahiti.

13.	*P. cæruleus*, Stebbing.	Marine Invest. S. Africa, Crust. pt. III. 1905, p. 77, pl. xxi. xxi *bis*.	E. coast of S. Africa, about 33° S.

vi. Uncertain and doubtful species :—

14.	*P. balboæ*, Faxon.	Bull. Mus. Comp. Zool. Harvard, XXIV. 1893, p. 211; and Mem. Mus. Comp. Zool. Harvard XVIII. No. 15, 1895, p. 181, pl. xlvii. fig 1-1*c*. Somite XIV has a pleurobranch; all the thoracic legs have exopodites; there is no postocular spine and crest; the antennular flagella are longer than their peduncle; but the telson is armed with minute lateral spinclets. This last character separates it from the *P. indicus* group to which it otherwise adheres.	Off Cocos Islands (G. of Panama region) 770 fathoms.
	P. orbignyanus, Latreille.	Nouv. Dict. d'Hist. Nat. XXV. 1817: Milne Edwards *op. cit.*, p. 415. Considered by Milne Edwards to be not specifically different from *P. setiferus*, L.	B. of Biscay.
	P. gracilirostris, Thallwitz.	Abh. u. Ber. Zool. Mus. Dresden, 1890–91, No. 3, p. 3, fig. 5. May perhaps be an abnormal individual of *P. semisulcatus*, De H.	N. Celebes.

II. Genus Heteropeneus, de Man.

1.	*H. longimanus*, de Man.	Zool. Anzeiger, 1896, p. 111, and Zool. Jahrb., Syst., X. 1898, p. 684, pl. xxxviii. fig. 75: Nobili, Boll. Mus. Torino, XVIII. 1903, No. 455, p. 4.	East Indian Archipelago.

III. Genus Metapeneus, Wood-Mason.

i. Species having no lateral marginal spines on the telson: the last pair of thoracic legs are without an exopodite and, *in the adult male*, their merus has a notch and spine, or tooth, at its proximal end.

1.	M. monoceros, Fabr.	*Ante.*	E. Africa to Japan and Australia.
2.	M. affinis, Edw.	*Ante.*	Karachi to Japan.
	(*M. mutatus*, Lanchester.	Perhaps = *M. affinis*, Edw. P.Z.S. 1901, II. p. 572, pl. xxxiv. fig. 6: Nobili, Boll. Mus. Torino, 1903, No. 455, p. 3.	Malay Peninsula.)
3.	M. dobsoni, Miers.	*Ante.*	India and Ceylon.
4.	*M. Joyneri*, Miers.	Ann. Mag. Nat. Hist. (5) V. 1880, p. 458, pl. xv. fig. 8–10. Very close to *M. Dobsoni*. Kishinouye, Journ. Fish. Bur., Tokyo, VIII. i. 1900, p. 19, pl. v., vii. fig. 7, 7*a-c*.	Japan.
5.	M. brevicornis, Edw.	*Ante.*	Mauritius to Borneo.
6.	M. lysianassa, de Man.	*Ante.*	Bengal to Singapore.

ii. Species without lateral marginal spines on telson, and without notch or spine on merus of last pair of thoracic legs:—

7.	*M. deschampsi*, Nobili.	Boll. Mus. Torino, XVIII. 1903, No. 452, p. 2, fig. 1. May possibly be the non-adult form of *M. monoceros*.	Pondicherry and Mahé.

iii. Telson with 3 or 4 pairs of lateral marginal spines:—

8.	M. ENSIS, De Haan.	Faun. Japon. Crust. p. 192, pl. xlvi. fig. 2, 1849. "*Mas deest.*" ? No exopodite on last pair of thoracic legs.	Japan: India?
[	*M. intermedius*, Kishinouye.	Journ. Fish. Bur. Tokyo, VIII. 1, 1900, p. 21. Male unknown. May perhaps be the same as *M. ensis* De Haan.	Japan.]
9.	*M. Macleayi*, Haswell.	P.L.S., N.S.W. IV. 1879, p. 40, and Cat. Austral. Crust. 1882, p. 201: Miers, Ann. Mag. Nat. Hist. (5) V. 1880, p. 458: de Man, Notes Leyden Mus. XII. 1890, p. 124: Whitelegge, Mem. Austral. Mus. IV. ii. 1890, p. 197. No exopodite on last pair of thoracic legs.	E. coast of Australia.
10.	*M. Stebbingi*, Nobili.	Bull. Mus. d'Hist. Nat. Paris, 1904, p. 229. (5th pair of thoracic legs of adult male as in *M. monoceros* group.)	Red Sea; Suez.
11.	*M. cognatus*, Nobili.	Nobili, *loc. cit.*	G. of Aden.
12.	*M. Richtersii*, Miers.	Zool. H.M.S. Alert, p. 564, pl. lii. fig. A, 1884. Exopodites on all the thoracic legs.	Madagascar Seas.

iv. Telson with 3 or 4 pairs of lateral marginal spines: andricum asymmetrical: all the thoracic legs with exopodites:—

13.	*M. philippinensis*, Sp. Bate.	Challenger Macrura, p. 261, pl. xxxv. fig. 2, 3.	E. Indian Archipelago. 82–150 fathoms.
14.	M. CONIGER, W. M.	*Ante.*	Indian Seas, 56–250 fathoms.
	" " var. ANDAMANENSIS, W. M.	*Ante.*	Indian Seas, 100–244 fath
15.	*M. commensalis*, Borradaile.	P.Z.S. 1898, p. 1001, pl. lxiii. fig. 1. Commensal with a sea-anemone.	Rotuma, S. Pacific.
16.	*M. akayebi*, Rathbun.	Proc. U.S. Nat. Mus. XXVI. 1902, p. 39 (ex "*P. velutinus*" of Spence Bate): *P. velutinus* Kishinouye, Journ. Fish. Bur., Tokyo, VIII. i. 1900, p. 26, pl. vi, fig. 3, pl. vii. fig. 11, 11*a*, *b*.	Japan.
17.	M. STRIDULANS, W. M.	*Ante* (ex "*P. velutinus*" of Spence Bate). Possibly the same as *M. akayebi* Rathbun.	Indian Seas, to Hongkong.
18.	M. MOGIENSIS, Rathbun.	Rathbun, *loc. cit.* (ex "*P. velutinus*" Spence Bate).	Malabar coast, to Japan.
19.	*M. Dalei*, Rathbun.	Rathbun, *loc. cit.*	Japan.
20.	*M. acclivis*, Rathbun.	Rathbun, *loc. cit.*	Japan.
21.	*M. consobrinus*, Nobili.	Bull. Mus. d'Hist. Nat. Paris, 1904, p. 229.	G. of Aden.
22.	*M. Vaillanti*, Nobili.	Nobili *loc. cit.*	Red Sea; Suez.
23.	*M. perlarum*, Nobili.	Bull. Mus. d'Hist. Nat. Paris, 1905, p. 158.	Persian Gulf.

24. *M. lamellatus*, De Haan.	Faun. Japon. Crust., p. 193, pl. xlvi. fig. 4, 5: Kishinouye, Journ. Fish. Bur., Tokyo, VIII. i. 1900, p. 25, pl. vi. fig. 1, pl. vii. fig. 12: Doflein, Abh. bayer Akad. München, 1902, p. 631.	Japan.
25. *M. Batei*, Miers.	Zool. H.M.S. Alert, p. 296, pl. xxxii. fig. D.	Torres Strait (Australia.)

v. Uncertain species, and species doubtfully referable to the genus *Metapeneus*:—

(*M. incisipes*, Sp. Bate.	Challenger Macrura, p. 257, pl. xxiv. fig. 2. Probably a synonym of *M. affinis*, Edw.	Malaysian Seas.)
M. Mastersii, Haswell.	P.L.S., N.S.W. 1879, p. 42; and Cat. Austral. Crust. 1882, p. 203. Probably belongs either to *M. affinis* or to *M. Deschampsi* group.	N. Australia (Pt. Darwin.)
M. villosus, Guérin.	Voy. "Coquille," II. Zool., Crust. p. 36; and Icon. Règne Animal, pl. xx. fig. 1. May possibly rank alongside *M. Deschampsi*.	Australia.
M. gracilis, Dana.	U.S. Expl. Exp., Crust. pt. I. p. 606, pl. xl. fig. 7*a*, *b*. Possibly comes near *M. philippinensis*. See also Spence Bate, Challenger Macrura, p. 271.	Sulu Sea: New Hebrides: Australia.
M. palmensis, Haswell.	P.L.S., N.S. Wales, 1879, p. 43; and Cat. Austral. Crust., p. 204. May possibly belong to *M. akayebi* group: may possibly be a *Trachypeneus*.	N. E. coast Australia.
M. pubescens, Stimpson.	Ann. Lyc. Nat. Hist. N. York, X. 1874, p. 133: Kingsley, Bull. Essex Inst. X. 1878, p. 70. *Akayebi* group.	S. Thomas (W. Indies.)
M. Goodei, S. I. Smith.	Proc. U.S. Nat. Mus. VIII. 1885, p. 176. *Akayebi* group.	Bermuda: B. of Panama.
M. velutinus, Dana.	U. S. Expl. Exp. Crust., pt. I. p. 604, pl. xl. fig. 4, 1852: Stimpson, Proc. Acad. Nat. Sci. Philad. 1860, p. 44: Richters, in Möbius Meeresf. Maurit. 1880, p. 166: Miers, Ann. Mag. Nat. Hist. (5) III. 1881, p. 367, and Zool. H.M.S. Alert, 1884, p. 296: *vix* Spence Bate, Challenger Macrura, 1888, p. 253. Ortmann, Zool. Jahrb., Syst., V. 1890, p. 452: Henderson, Trans. Linn. Soc. (2) V. 1893, p. 449: Lanchester, Ann. Mag. Nat. Hist. (7) VI. 1900, p. 263, and P.Z.S. 1901, II. p. 570: *nec* Kishinouye, Journ. Fish. Bur., Tokyo, VIII. i. p. 26, pl. vi. fig. 2, pl. vii. fig. 11, 11*a*, *b*: Doflein, Abh. bayer. Ak. München, 1902, p. 631: Nobili, Boll. Mus. Torino, XVIII. 1903, No. 452, p. 3, No. 455, p. 4. *P. affinis*, Miers, P.Z.S. 1878, p. 304: Heller, Novara Crust. p. 123. It is doubtful whether any one can settle the question of "*Penæus velutinus*"; whether it is a *Metapeneus* of the *akayebi* group, or a *Trachypeneus*. The "Challenger" duplicates presented to the Indian Museum as *P. velutinus* include two very distinct species; namely, a stridulating form identical with an Indian species named by Wood Mason *P. stridulans*; and a species, the male of which has a peculiarly unsymmetrical andricum, identical with Miss Rathbun's *P. mogiensis*. According to Miss Rathbun the Challenger duplicates afford yet another species—the *P. velutinus* of Kishinouye—which *may* be Dana's *P. velutinus*, but is named by Miss Rathbun *P. akayebi*.	

IV. Genus Parapeneus, S. I. Smith, *sensu restricto*.

i. Telson with a single pair of lateral marginal spines, which are fixed: carapace with a fine longitudinal fissure or suture, extending on either side from the orbital margin to the posterior border: tip of andricum, in the adult, cut up into spines or hooks and lobules or filaments:—

1.	*P. membranaceus*, Risso.	Risso, Crust. Nice, p. 98, 1816, and Hist. Nat. Europ. Mérid. V. p. 68, 1826: Heller, SB. Ak. Wien, XLV. 1862, p. 423, pl. ii. fig. 49, and Crust. südl. Europ. p. 296, pl. x. fig. 11: Miers, P.Z.S. 1878, p. 301: Carus, Prodr. Faun. Medit. 1885, 471: List, Mitth. Zool. Sta. Neapel. XII. 1897, p. 81 (locomotion): Adensamer, Denk. Ak. Wien, LXV. 1898, p. 628: Bianco, Mitth. Zool. Sta. Neap. XV. 1902, p. 437 (in *Pyrosoma*). *Penæus longirostris*, Lucas, Hist. Nat. Anim. Artic. in Expl. Sci. Algérie, Zool. pt. I. p. 46, pl. iv. fig. 6, 1849: S. I. Smith, Proc. U.S. Nat. Mus. VIII. 1885, p. 171 (*Parapenæus*). *Penæus bocagei*, Johnson, P.Z.S. 1863, p. 255, and 1867, p. 900: Capello, Mem. Acad. Lisboa, (2) III. part ii. 1865, Art. 8, p. 8, fig. 4, 4*a*.	Mediterranean; Portugal.
2.	*P. politus*, S. I. Smith.	Proc. U.S. Nat. Mus. III. 1881, p. 444, and VIII. 1885, p. 172.	N. Atlantic coast of U.S. America.
3.	*P. megalops*, S. I. Smith.	Proc. U.S. Nat. Mus. VIII. 1885, p. 172: Rathbun, Bull. U.S. Fish. Comm. 1900 (1901), p. 102.	W. Indies and neighbourhood, to 288 fathoms.
4.	P. FISSURUS, Bate.	*Ante.*	Bay of Bengal to 136°E., and to 115 fathoms.
5.	P. INVESTIGATORIS Alc. & And.	*Ante.*	Region of B. of Bengal, to 419 fathoms.
6.	*P. americanus*, Rathbun.	Bull. U.S. Fish. Comm. 1900 (1901), p. 102.	Porto Rico, 220–225 fathoms.
7.	P. LONGIPES, Alcock.	*Ante.*	Indian coasts, to 35 fathoms.

ii. Telson with 2 or 3 pairs of articulating marginal spines in addition to the fixed pair: carapace without longitudinal sutures: andricum of adult simple, pod-shaped.

8.	P. RECTACUTUS, Bate.	*Ante.*	B. of Bengal to Fiji, to 419 fathoms.
9.	*P. serratus*, Bate.	Ann. Mag. Nat. Hist. (5) VIII. 1881, p. 182: and Challenger Macrura p. 268, pl. xxxvii. fig. 1.	Torres Strait: Fiji: 315–1400 fathoms.

V. Genus Parapeneopsis, Wood-Mason.

i. Species with epipodites on the 2nd maxillipeds and first two pairs of legs, and with lateral marginal spines on the telson:—

1.	P. STYLIFERA, Edw.	*Ante.*	Coasts of India.
1*a*.	„ „ var. COROMANDELICA.	*Ante.*	E. coast of India: Ceylon.

ii. Epipodites present on the 2nd maxillipeds and first two pairs of legs. Telson with small lateral marginal spinelets only as an occasional anomaly:—

2.	P. SCULPTILIS, Heller.	*Ante.*	India to China.

2*a*.	P. SCULPTILIS, Heller. var. HARDWICKII.	*Ante.*	India.
2*b*.	,, ,, var. CULTRIROSTRIS.	*Ante.*	E. coast of India.
3.	P. CORNUTA, Kishinouye.	Journ. Fish. Bur., Tokyo, VIII. i. 1900, p. 23: Nobili, Bull. Mus. Torino, 1903, No. 452, p. 6, and No. 455, p. 4.	Japan, Singapore, India.
	P. MAXILLIPEDO, Alcock.	*Ante.* (Probably identical with *P. cornuta*).	India
4.	P. UNCTA, Alc.	*Ante.*	Ganjam coast.
5.	P. NANA, Alc.	*Ante.*	E. coast of India.
6.	*P. gracillima*, Nobili.	Boll. Mus. Toriuo, 1903, No. 447, p. 4, fig. 1.	Borneo.

iii. Epipodite present on the 2nd maxillipeds only: no epipodites on any of the legs:—

7.	P. ACCLIVIROSTRIS, Alc.	*Ante.* (Possibly identical with *P. tenella*).	Persian G.; Coromandel coast.
8.	*P. Hungerfordi*, Alc.	Ann. Mag. Nat. Hist. (7) xvi, 1905, p. 530.	Hongkong.

iv. Species probably referable to *Parapeneopsis*:—

P. tenella, Bate.	Challenger Macrura, p. 270, 1888: Kishinouye, Journ. Fish. Bur., Tokyo, VIII. 1. 1900, p. 22, pl. vi. fig. 3, vii. fig. 8, 8*a*, *b*.	Japan.
P. crucifera, Ortmann.	Zool. Jahrb., Syst. V. 1890, p. 451, pl. xxxvi. fig. 5*a*, *b*. According to Kishinouye is synonymous with *P. tenella*.	Japan.

VI. Genus TRACHYPENEUS, Alcock.

1.	*T. barbatus*, De Haan.	*P. affinis barbatus*, De Haan, Faun. Japon. Crust. p. 192, pl. xlvi. fig. 3, 1849. *Parapeneus barbatus*, S. I. Smith, Proc. U. S. Nat. Mus. VIII. 1885, p. 176.	Japan.
2.	*T. constrictus*, Stimpson.	Ann. Lyc. Nat. Hist. N. York, X. 1874, p. 135: Kingsley, Proc. Acad. Philad., 1878, p. 330; 1879, p. 427; and Bull. Essex Inst. X. 1878, p. 70; and XIV. 1882, p. 106: S. I. Smith, Proc. U. S. Nat. Mus. 1885, p. 174: Rathbun, Bull. U.S. Fish. Comm. 1900 (1901), p. 101.	Atlantic coast of U. S. America: West Indies.
2*a*.	,, ,, var. *similis*, S. I. Smith.	Proc. U.S. Nat. Mus. 1885, p. 175: Rathbun, *loc. cit.*	W. Indies.
3.	T. ASPER, Alcock.	*Ante.*	Persian G.; B. of Bengal.

Doubtful species:—

	T. curvirostris, Stimpson.	Proc. Acad. Philad. 1860, p. 44: Ortmann, Zool. Jahrb., Syst., V. 1890, p. 451, pl. xxxvi. fig. 4*a*, *b*: Kishinouye, Journ. Fish. Bur., Tokyo, VIII. i. 1900, p. 23, pl. vi. fig. 4, pl. vii. fig. 10, 10*a-c*: Doflein, Abh. bayer. Ak. München, 1902, p. 631: Rathbun, P. U.S. Nat. Mus. 1902, p. 38. Probably the same as *T. barbatus*, De H.	Japan.

T. granulosus, Haswell.	P.L.S, N.S.W., 1878, p. 41; and Cat. Austral. Crust. 1882, p. 202: Miers, Zool. H.M.S. Alert, 1884, p. 295. Miers' specimens are identical with *P. anchoralis* Spence Bate, which Kishinouye inclines to regard as synonymous with *T. barbatus*, De H.	N. coast of Australia.
T. anchoralis, Bate.	Ann. Mag. Nat. Hist. (5) VIII. 1881, p. 181; and Challenger Macrura, 1888, p. 258, pl. xxxv. fig. 1. According to Kishinouye the male of this species is the same as *T. curvirostris*, but the female is not.	Japan and Arafura Sea.

VII. Genus Xiphopeneus, S. I. Smith.

Xiphopeneus, S. I. Smith, Amer. Journ. Sci. XLVIII. 1869, p. 390; Trans. Connect. Acad. II. 1871, p. 27; and Proc. U.S. Nat. Mus. VIII. 1885, p. 188.

Rostrum toothed dorsally only. Antero-inferior angles of carapace subdentiform. Post-antennular sulcus defined only ventrally.

Carapace with longitudinal and transverse sutures, but the former are not prolonged to the posterior border.

One of the antennular flagella is very long. Endopodite of maxillule short, unsegmented. All the thoracic legs have exopodites.

Epipodites are absent from the 3rd maxillipeds and last two pairs of thoracic legs. No pleurobranchiæ on the last two thoracic somites.

The last two pairs of thoracic legs are of great length, their three terminal joints forming a long slender flagellum.

The branchial formula is as follows:—

Somite.	Podobranchiæ.	Arthrobranchiæ.	Pleurobranchiæ.		Total.
VII	ep.	*r*	0	=	ep.+*r*
VIII	ep. +1	2	0	=	ep.+3
IX	0	2	1	=	3
X	ep.	2	1	=	ep.+3
XI	ep.	2	1	=	ep.+3
XII	ep.	2	1	=	ep.+3
XIII	0	1	0	=	1
XIV	0	0	0	=	0
Total	5 ep.+1	11+*r*	4	=	5 ep.+16+*r*.

1. *X. Kroyeri*, Heller.	SB. Ak. Wien, XLV. 1862, i, p. 425, pl. ii. fig. 51: Miers, P.Z.S. 1878, p. 305: Kingsley, Bull. Essex Inst. XIV. 1882, p. 106: S. I. Smith, Proc. U.S. Nat. Mus. VIII. 1885, p. 188: Rathbun, Bull. U.S. Fish. Comm. 1900 (1901) p. 102. *X. Harttii*, S. I. Smith, Amer. Journ. Sci. XLVIII. 1869, p. 390: Trans. Connect. Acad. II. 1871, p. 28, pl. i. fig. 1.	Brazil: Porto Rico.

VIII. Genus Atypopeneus, Alcock.

1. A. compressipes, Henderson.	*Ante.*	G. of Martaban and Madras coast.

Species possibly referable to *Atypopeneus*:—

P. podophthalmus, Stimpson.	Proc. Acad. Nat. Sci. Philad. 1860, p. 43.	Hongkong.

P. stenodactylus, Stimpson.	Proc. Acad. Philad. 1860, p. 43.	Hongkong.

IX. Sedis Incertioris

"*Penæus planicornis*," Fabr.	Entomol. Syst., Suppl. p. 409, 1798: Milne Edwards, Hist. Nat. Crust. II. 417. Can hardly be a *Peneus* as its antennular flagella are compressed.	Indian Ocean.
"*Penæus tenuis*," Dana.	U.S. Expl. Exp., Crust. pt. I. p. 605, pl. xl. fig. 6. Position quite uncertain, except that it does not belong to the genus Peneus *sensu restricto*.	Atlantic coast of Patagonia.
"*Penæus novæguineæ*," Haswell.	P.L.S., N.S.W., 1879, p. 43, and Cat. Austral. Crust. 1882, p. 203. Is singular among *Penei* in not having a hepatic spine.	New Guinea.

NOTE.

I am indebted to Dr. Nobili for very kindly drawing my attention to the fact that *Peneus foliaceus* of Risso has been placed by Dr. A. Senna (Bull. Soc. Entomol. Ital. XXXIV., 1902, p. 269) in the genus *Aristeomorpha*. I regret that, owing to my absence in England at the time of its receipt here, Dr. Senna's important paper was overlooked in the preparation of this account of the genus *Peneus*.

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EXPLANATION OF PLATES.

Plate I.

Fig. 1.—*Peneus monodon*, Fabr., ♂ natural size

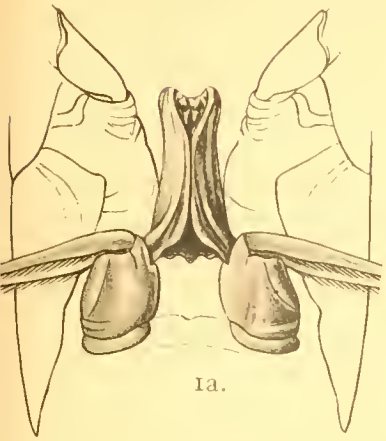
„ 1*a*. „ „ „ andricum, enlarged.

„ 1*b*. „ „ „ thelycum, „

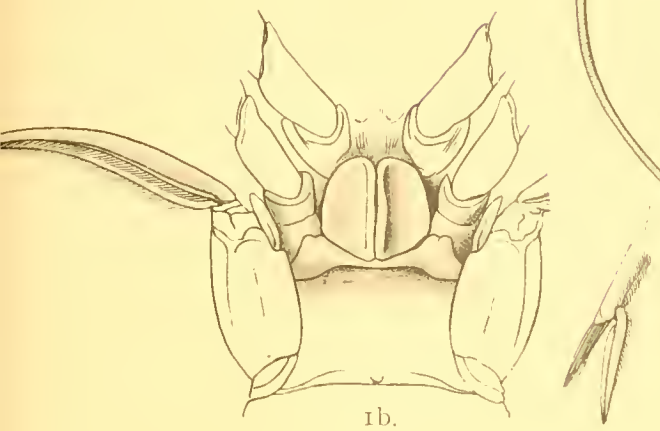
„ 2.—*Peneus semisulcatus*, De Haan, ♂ natural size.

„ 3.—*Peneus indicus*, Edw., ♂ „ „

„ 3*a*. „ „ „ young, „ „



1a.



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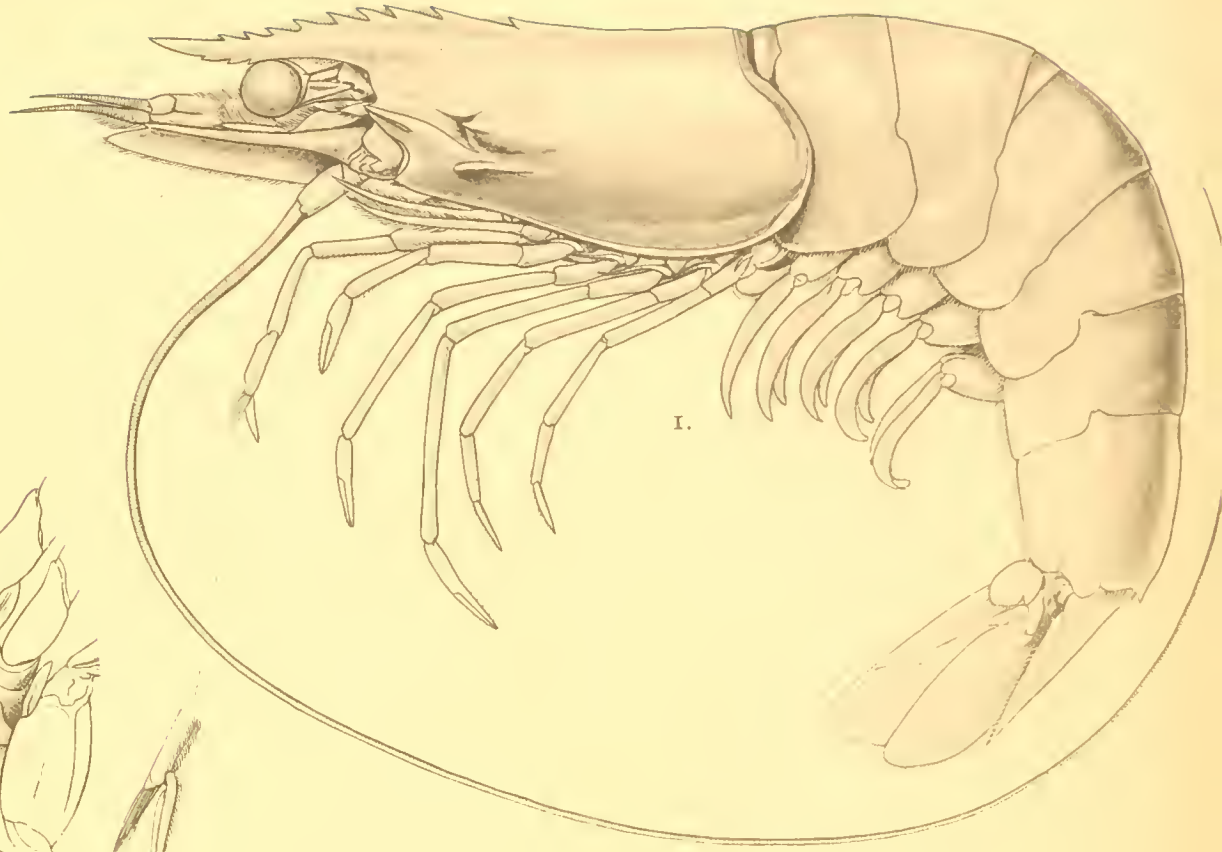
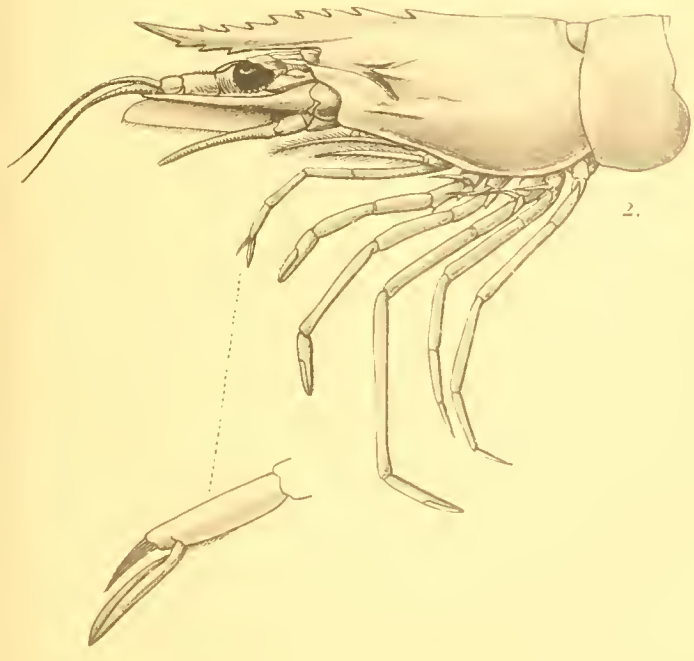


1.



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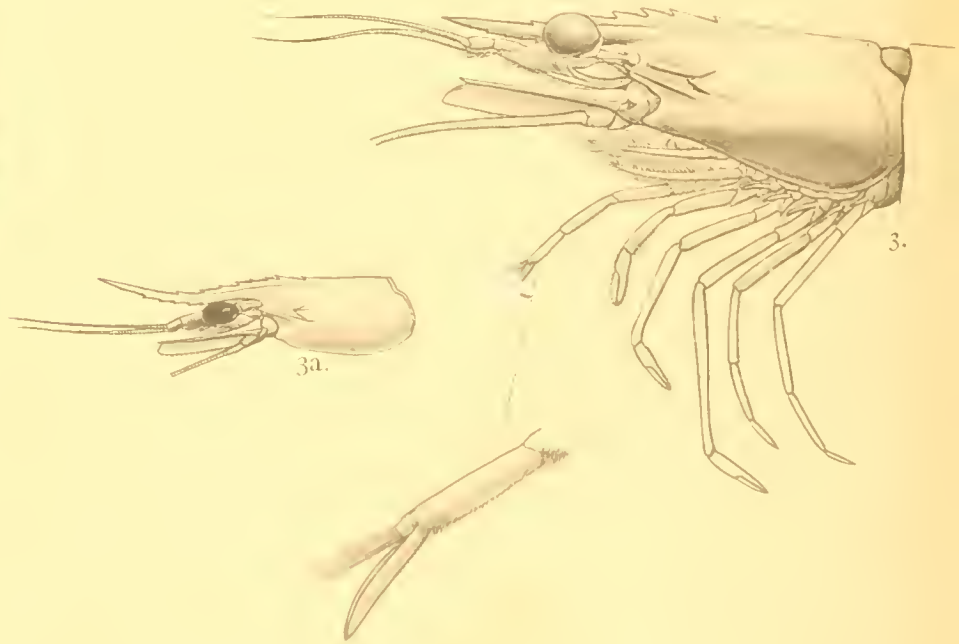


3a.

3.

1. *Peneus monodon.*

2. *Peneus semisulcatus.*

3. *Peneus indicus.*

BEMROSE, COLLO., DERBY.

EXPLANATION OF PLATES.

Plate II.

Fig. 4.—*Peneus indicus* var. *merguiensis*, de Man, ♂, natural size.

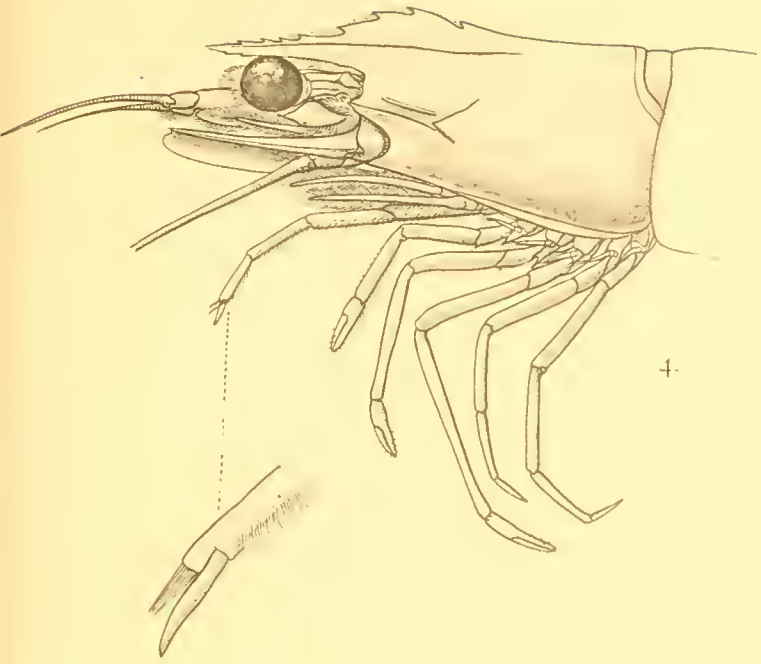
„ 5.—*Peneus indicus* var. *penicillatus*, W. M., ♂, „ „

„ 6.—*Peneus canaliculatus* (Oliv.), Edw. ♀, „ „

„ 6*a*. „ „ dorsal view of carapace, „ „

„ 6*b*. „ „ telson „ „

„ 6*c*. „ „ thelycum „ „



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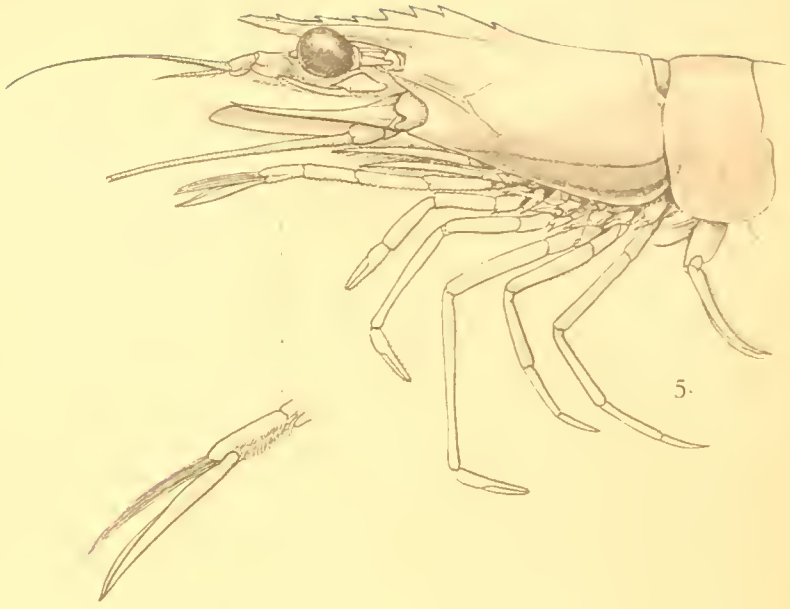

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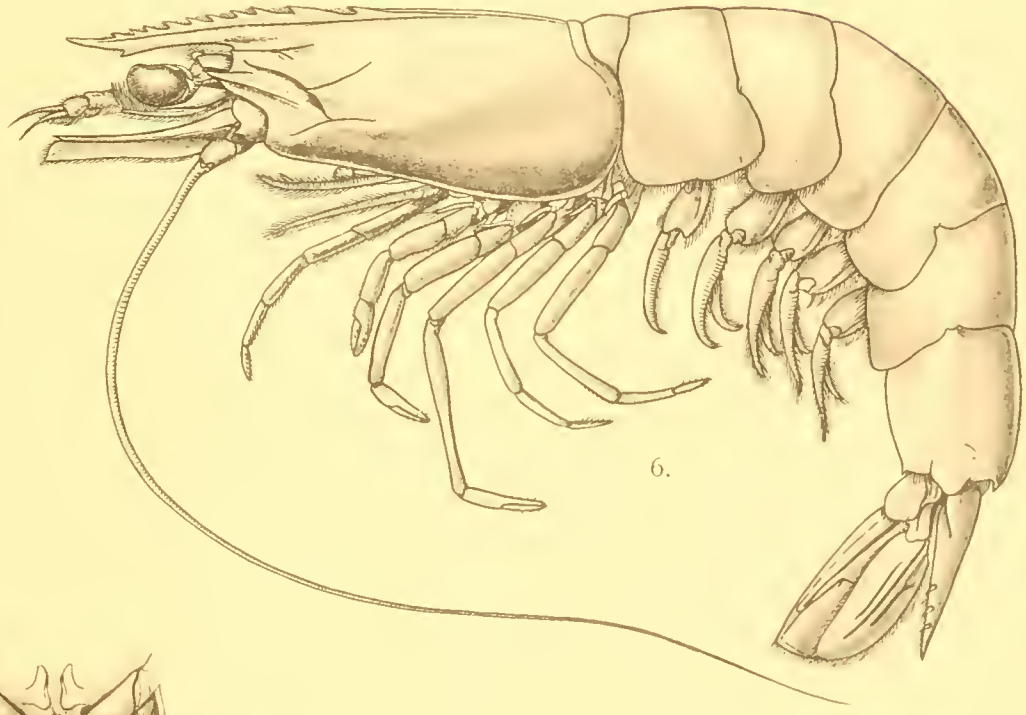
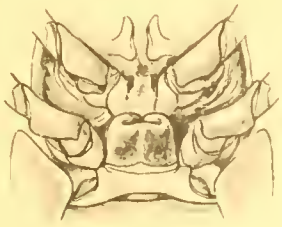


6.

6a.



6c × 2.

6b.

4. *Peneus indicus var. merguensis.* 5. *Peneus indicus var. penicillatus.* 6. *Peneus canaliculatus.*

BEMROSE, COLLO., DERBY.

EXPLANATION OF PLATES.

Plate III.

Fig. 7.—*Metapeneus monocerós*, Fabr., ♂ × 1½.

„ 7*a*. „ „ merus of 5th leg of ♂ × 2.

„ 7*b*. „ „ andricum × 2.

„ 7*c*. „ „ thelycum × 2.

„ 8.—*Metapeneus affinis*, Edw., ♂ × 1½. This specimen has an abnormal rostrum, the teeth being fewer in number than usual.

„ 8*a*. „ „ andricum × 2.

„ 8*b*. „ „ thelycum × 2.

„ 8*c*, *d*. „ „ rostra × 1½.

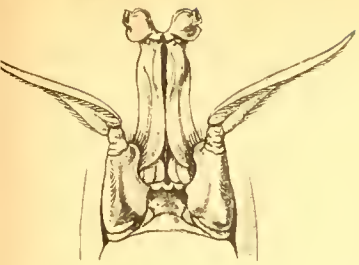
„ 9.—*Metapeneus dobsoni*, Miers, ♂ × 1½.

„ 9*a*. „ „ basal spine of 3rd pair of legs of ♂ × 2.

„ 9*b*. „ „ merus of 5th pair of legs of ♂ × 3.

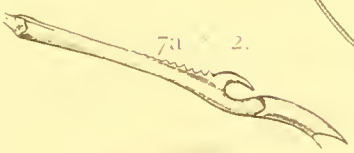
„ 9*c*. „ „ andricum × 2.

„ 9*d*. „ „ thelycum × 2.

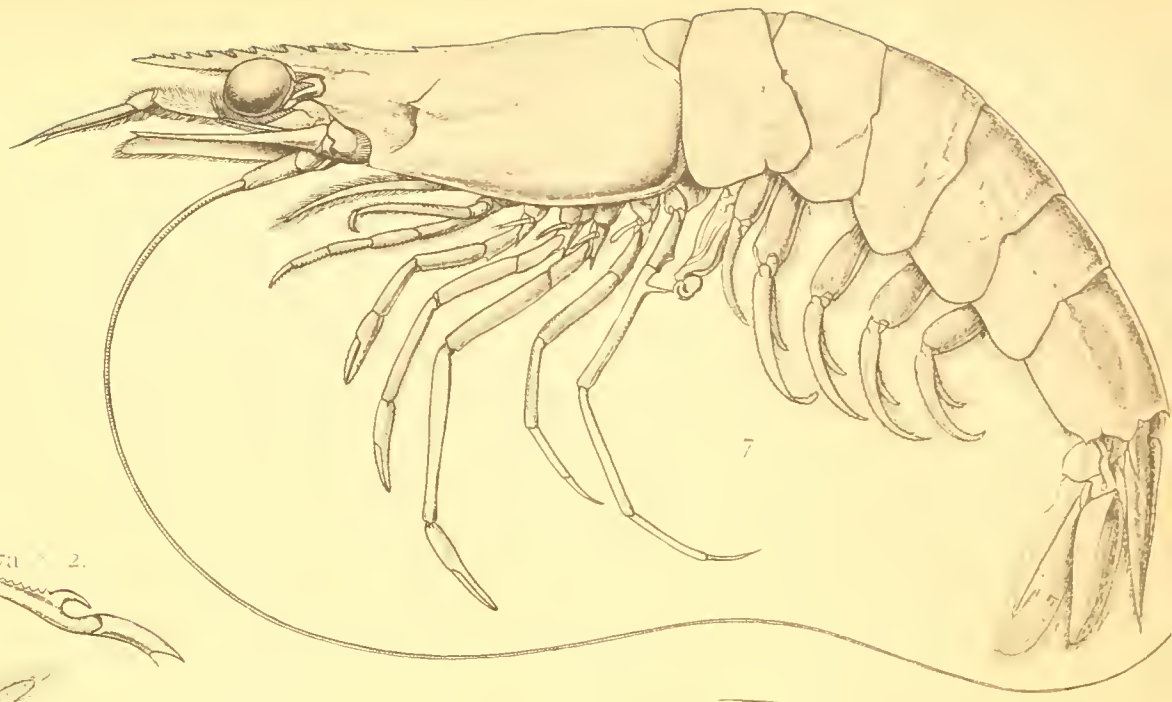


7b × 2.

7c × 2.



7a × 2.



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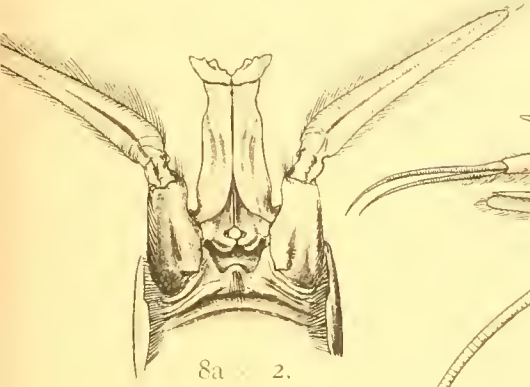
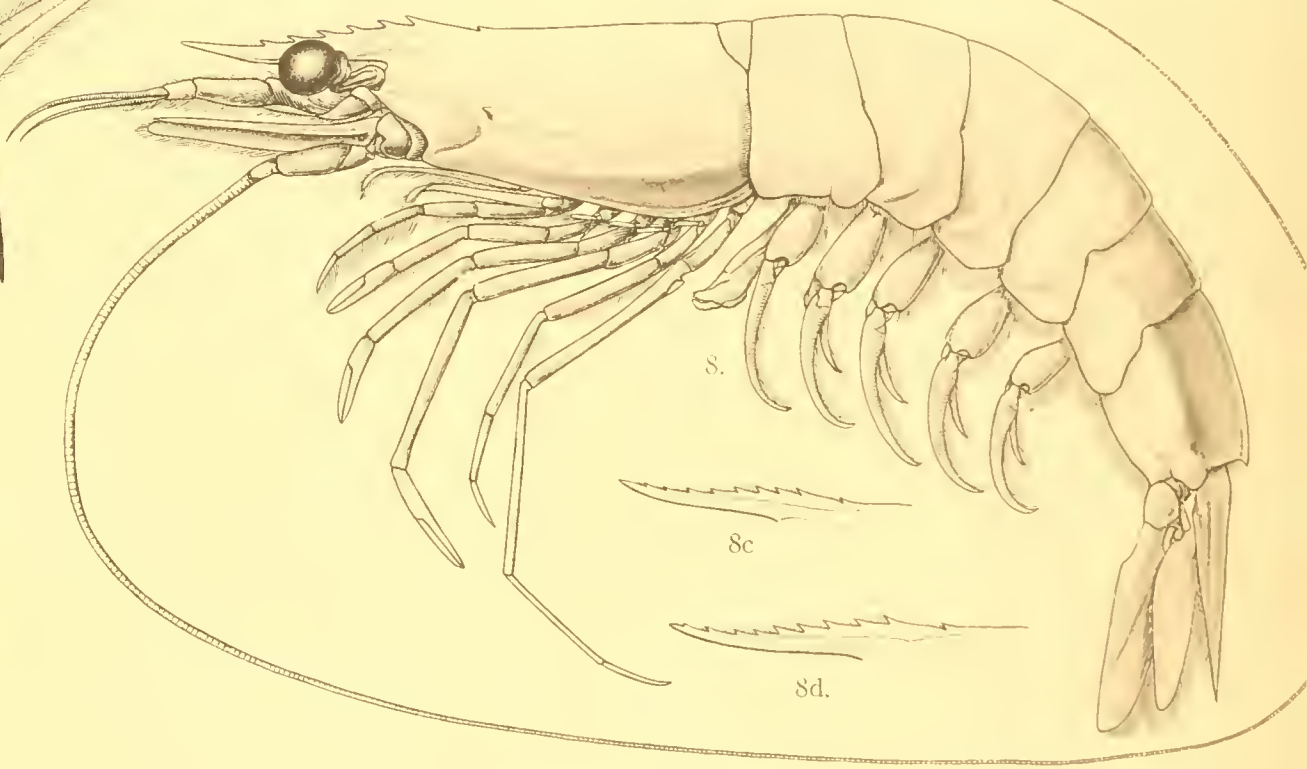


8a × 2.

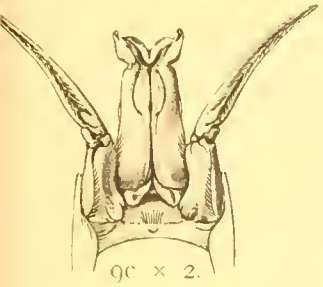
8b 2.



8.

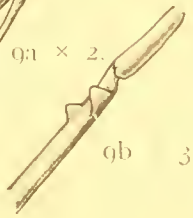
8c

8d.

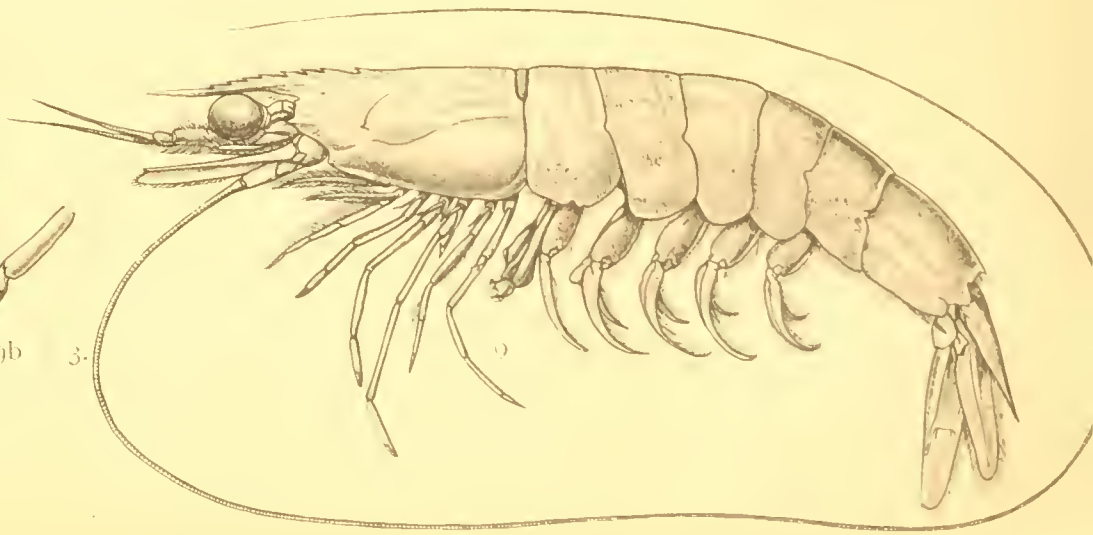


9c × 2.

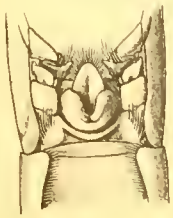
9a × 2.



9b 3.



9.



9d × 2.

7. *Metapeneus monoceros.* 8. *Metapeneus spinis.* 9. *Metapeneus Bissoni*

EXPLANATION OF PLATES.

Plate IV.

Fig. 10.—*Metapeneus brevicornis*, Edw., ♂ × 2.

„ 10*a*. „ „ andricum × $2\frac{1}{2}$.

„ 10*b*. „ „ thelycum × 2.

„ 11.—*Metapeneus lysianassa*, de Man, ♂ × 2.

„ 11*a*. „ „ base of 5th pair of legs of ♂ × 8.

„ 11*b*. „ „ andricum × 8.

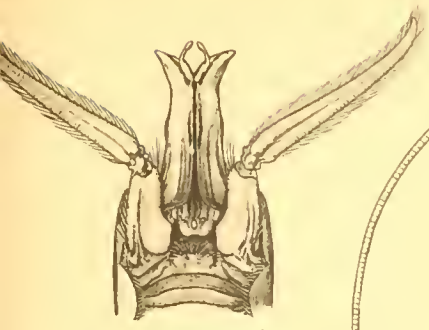
„ 11*c*. „ „ thelycum × 8.

„ 12.—*Metapeneus coniger*, Wood-Mason, ♂ × 2.

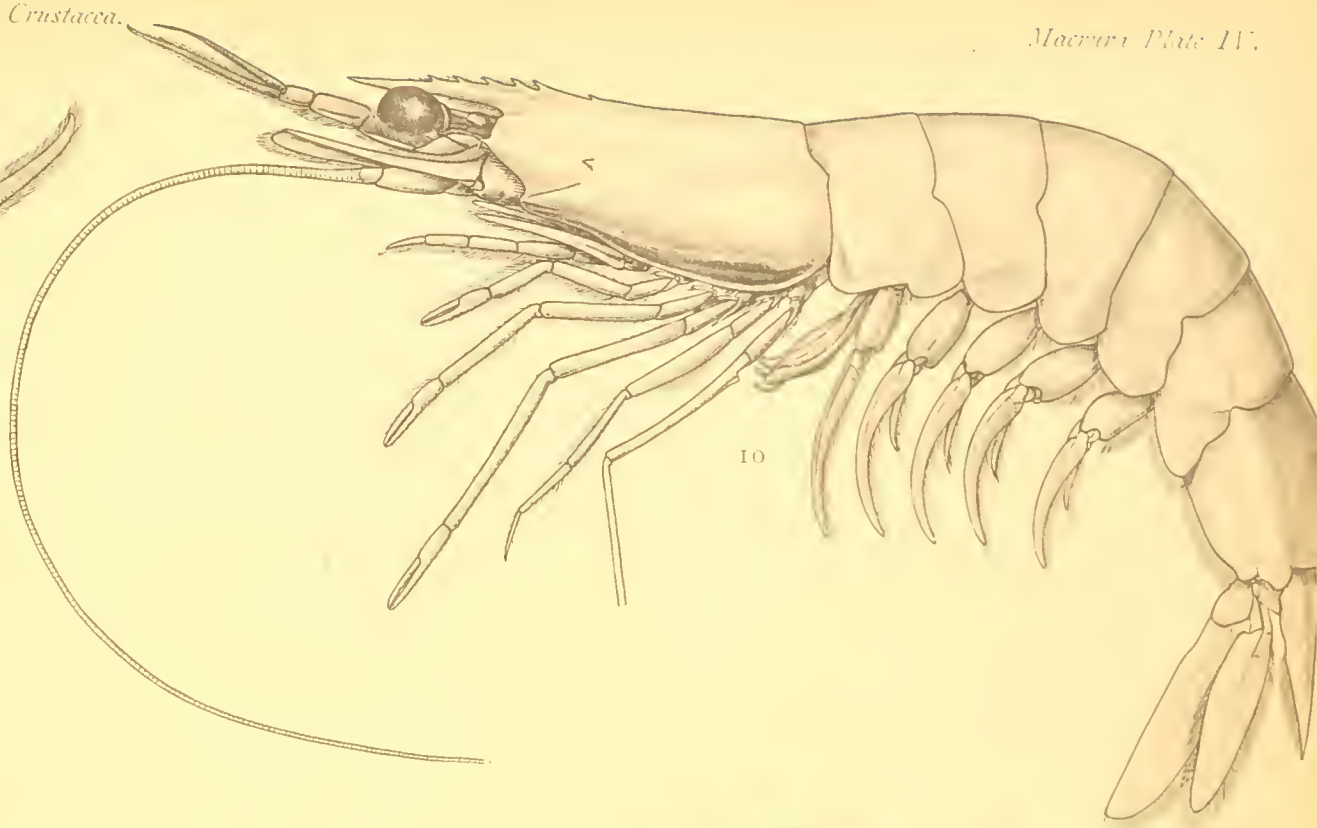
„ 12*a*. „ „ dorsal view of abdomen × 2.

„ 12*b*. „ „ andricum × 4.

„ 13.—*Metapeneus coniger* var. *andamanensis*, W.M., thelycum × 3.



10a × $2\frac{1}{2}$.



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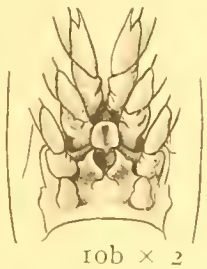
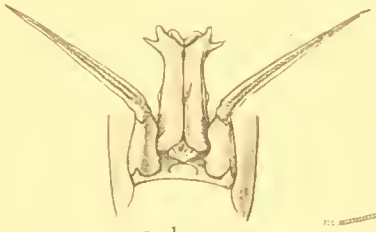
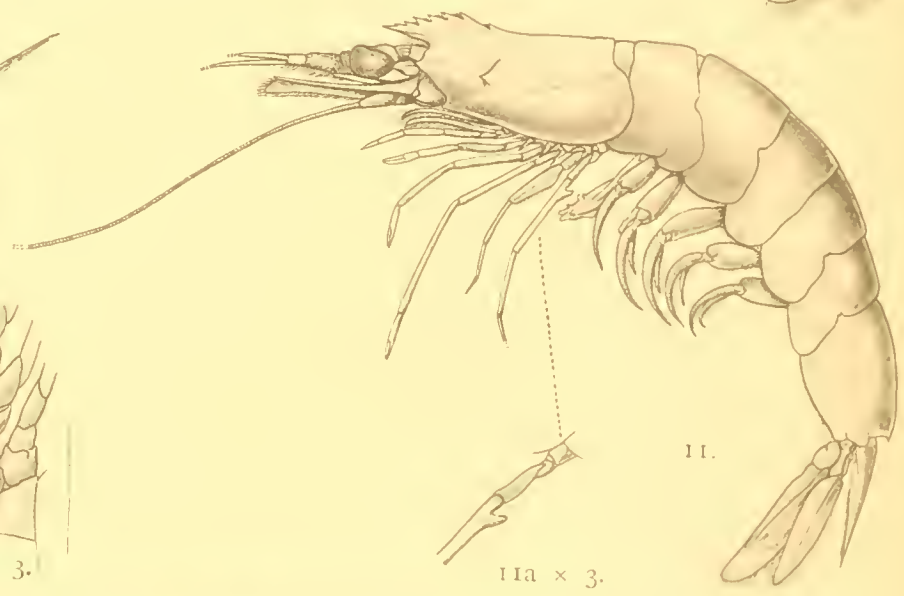


10b × 2

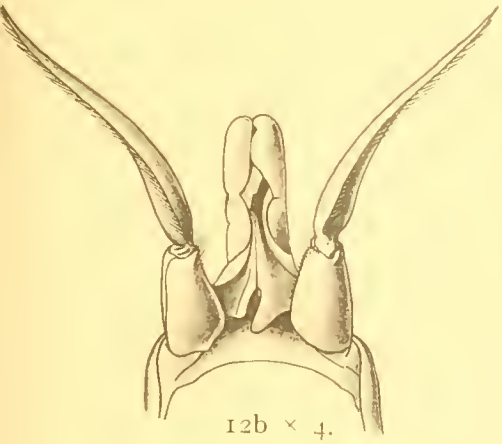


11b × 3.

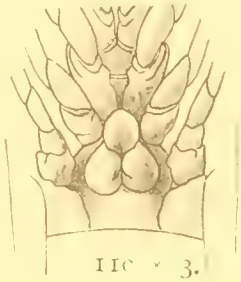


11

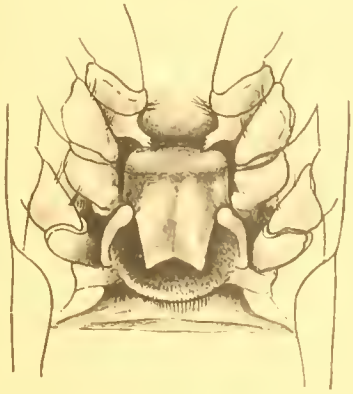
11a × 3.



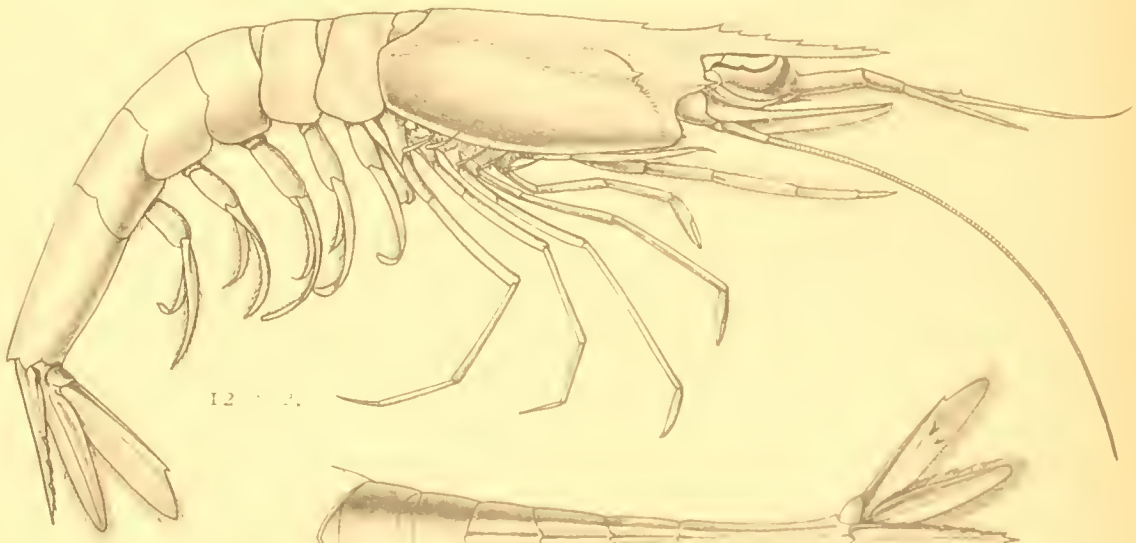
12b × 4.



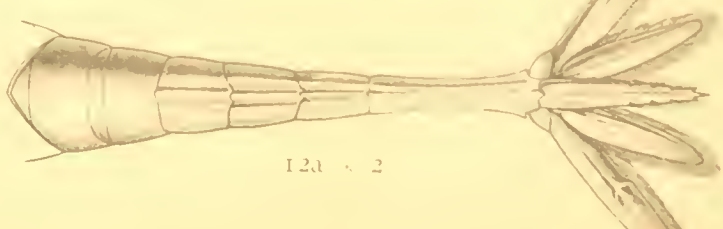
11c × 3.



13 × 3.



12



12a × 2

10. *Metapeneus brevicornis.*

11. *Metapeneus lysianassa.*

12. *Metapeneus emiger*

EXPLANATION OF PLATES.

Plate V.

Fig. 14.—*Metapeneus stridulans*, Wood-Mason, ♂ × 2.

„ 14*a*. „ „ carapace of ♂ × $2\frac{1}{2}$.

„ 14*b*. „ „ carapace of ♀ × $2\frac{1}{2}$.

„ 14*c*. „ „ andricum × $2\frac{1}{2}$.

„ 14*d*. „ „ thelycum × 8.

„ 15.—*Metapeneus mogiensis*, Rathbun, ♂ × 2.

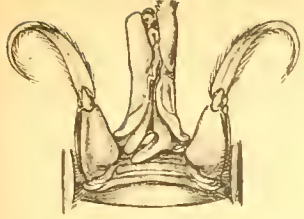
„ 15*a*. „ „ andricum × 3.

„ 15*b*. „ „ thelycum × $2\frac{1}{2}$.

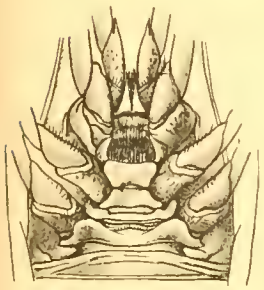
„ 16.—*Parapeneus fissurus*, Spence Bate, ♂ × $1\frac{1}{2}$.

„ 16*a*. „ „ andricum × 2.

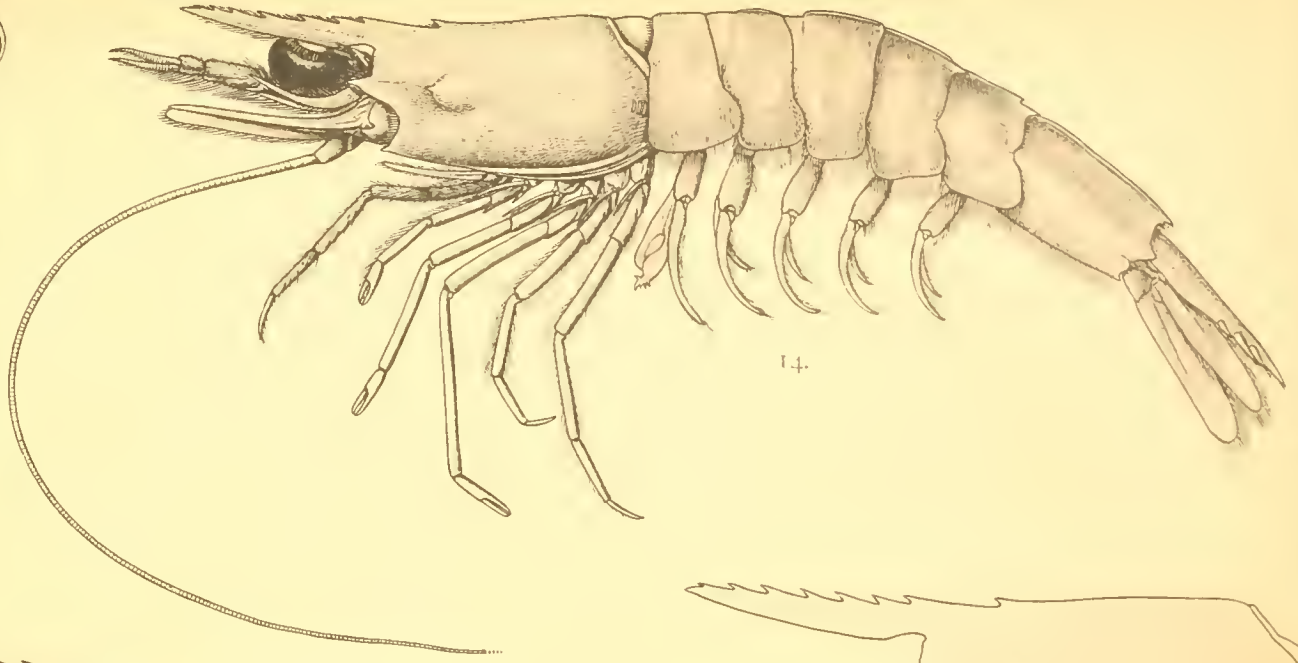
„ 16*b*. „ „ thelycum × $2\frac{1}{2}$.



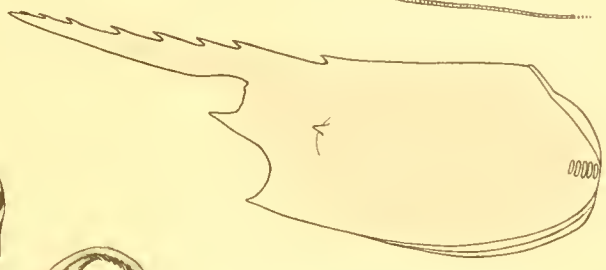
14c × 2½.



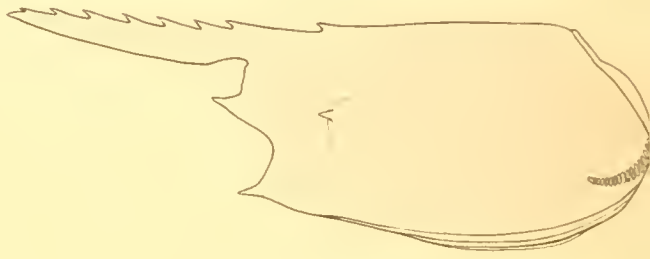
14d × 3.



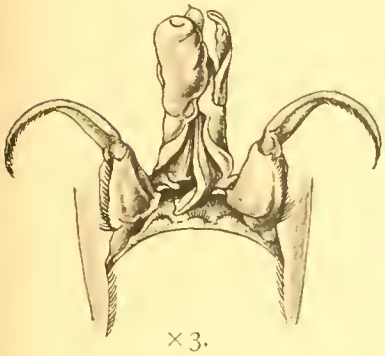
14.



14a × 2½.



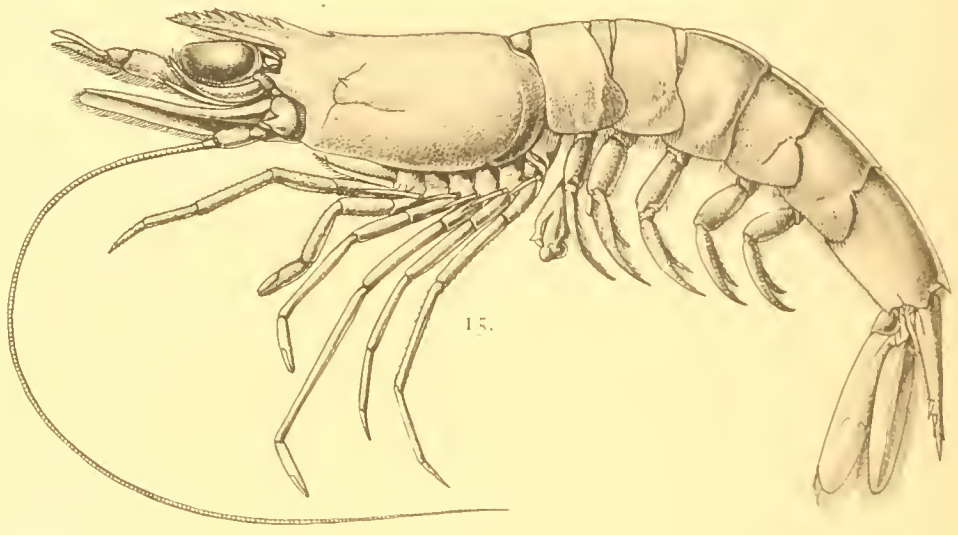
14b × 2½.



×3.

15a × 3.

15b × 2½.



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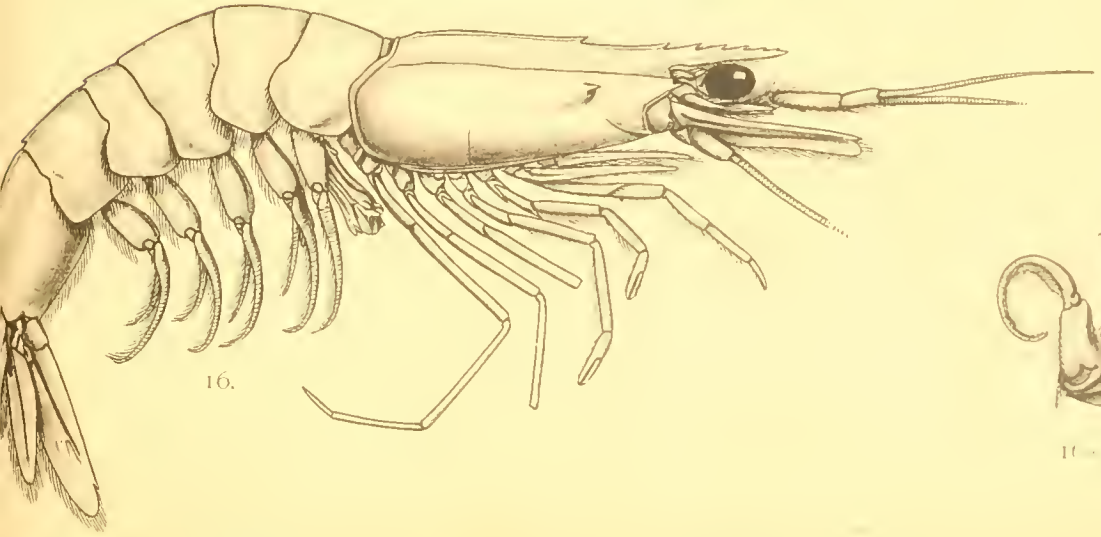

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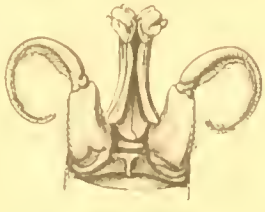
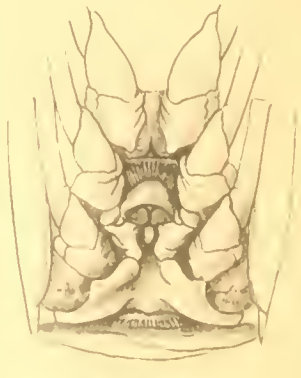


16a × 2.



16b × 2.

14. *Metapenæus stridulans.*

15. *Metapenæus mogiensis.*

16. *Parapenæus fissurus*

BEMROSE, C... D...

EXPLANATION OF PLATES.

Plate VI.

Fig. 17.—*Parapeneus investigatoris*, Alc. and And., ♂ × $2\frac{1}{2}$.

„ 17*a*. „ „ andricum, × 4.

„ 17*b*. „ „ carapace of ♀ × $2\frac{1}{2}$.

„ 17*c*. „ „ thelycum × 2.

„ 18.—*Parapeneus longipes*, Alcock, ♀ × $2\frac{1}{2}$.

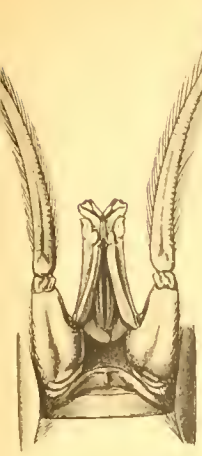
„ 18*a*. „ „ andricum, × 3.

„ 18*b*. „ „ thelycum, × 3.

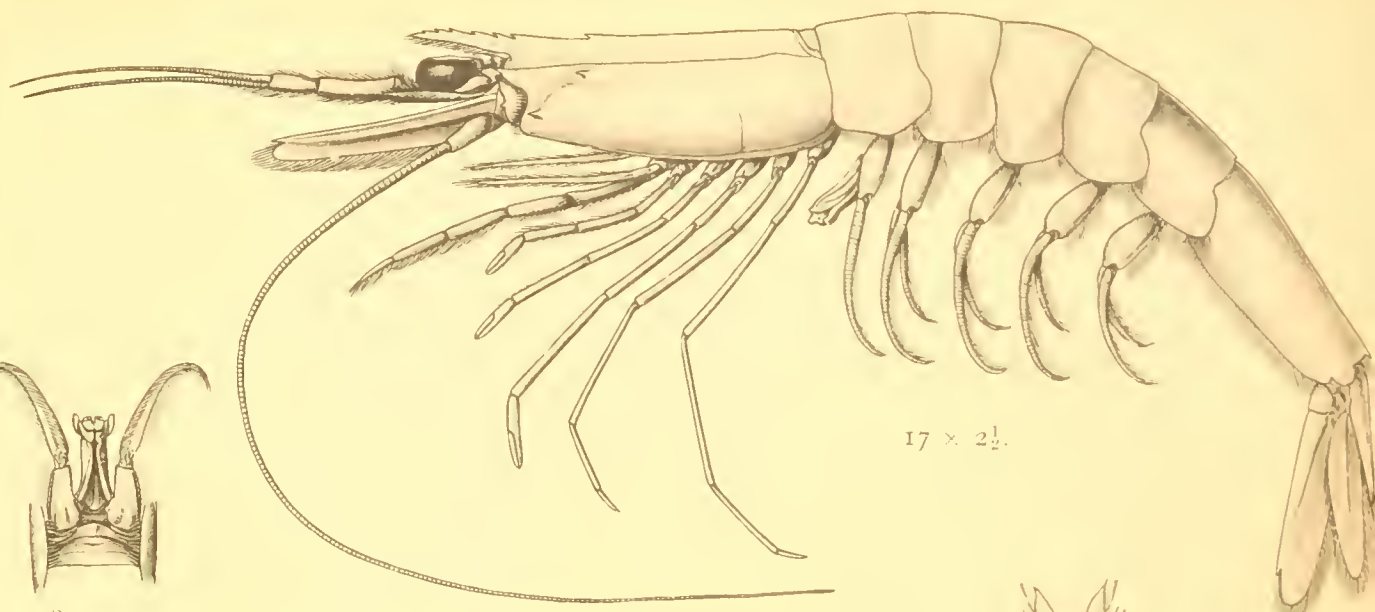
„ 19.—*Parapeneus rectacutus*, Spence Bate, ♂ × $1\frac{1}{2}$.

„ 19*a*. „ „ andricum × $2\frac{1}{2}$.

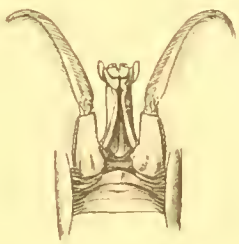
„ 19*b*. „ „ thelycum × $2\frac{1}{2}$.



17a × 4.

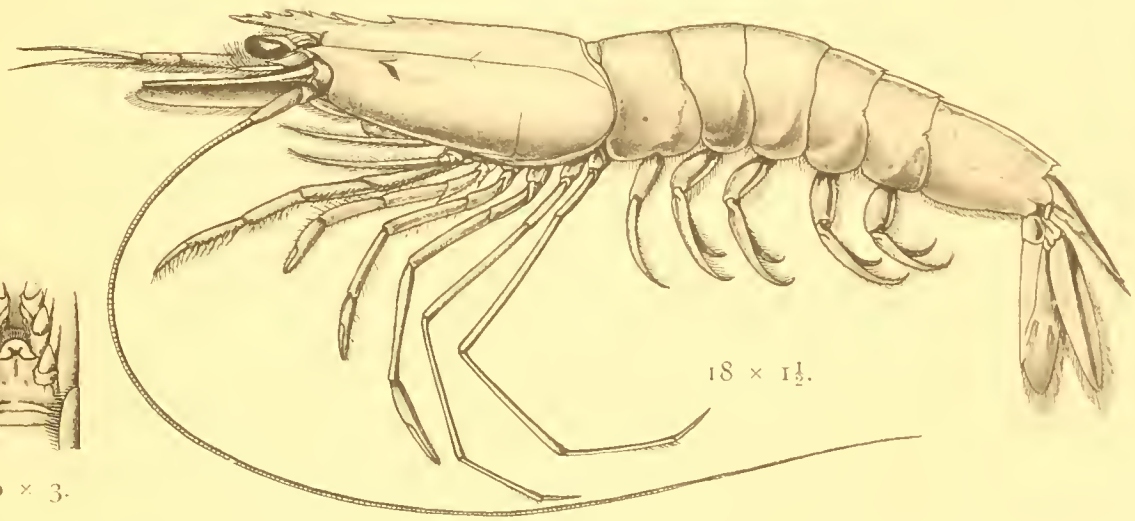


17 × 2½.



18a × 3.

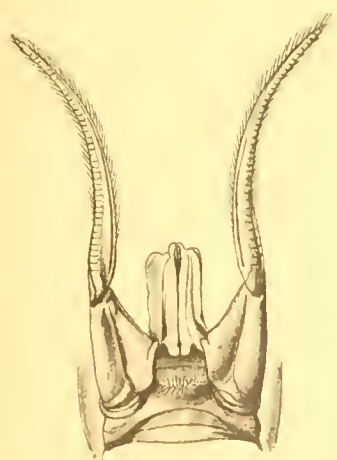
17c × 2



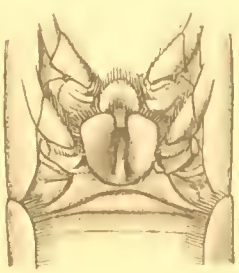
18 × 1½.

18b × 3.

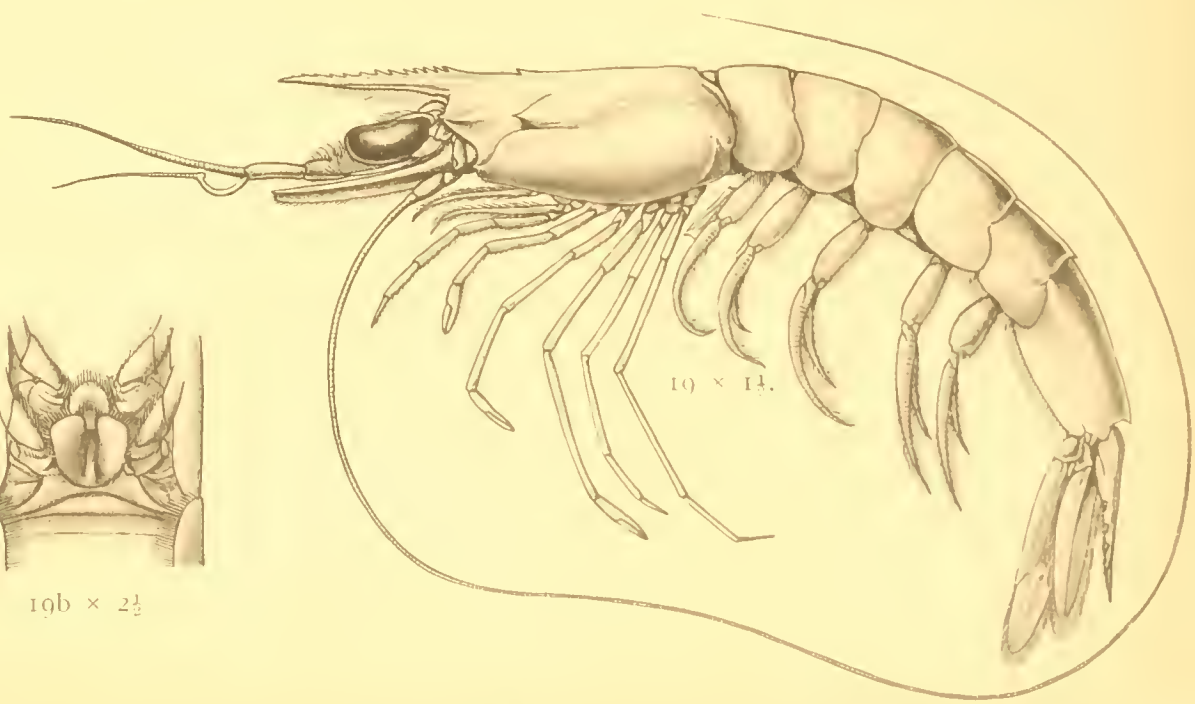
17b × 2½.



19a × 2½.



19b × 2½



19 × 1½.

17. *Parapeneus investigatoris.* 18. *Parapeneus longipes.* 19. *Parapeneus rectacutus.*

BIBLIOTHÈQUE DU

EXPLANATION OF PLATES.

Plate VII.

Fig. 20.—*Parapeneopsis stylifera*, Edw. var. *coromandelica*, Alc., ♂ × $1\frac{1}{2}$.

„ 20*a*. „ „ „ „ andricum × 8.

„ 20*b*. „ „ „ „ carapace of ♀ × $1\frac{1}{2}$.

„ 20*c*. „ „ „ „ thelycum × 2.

„ 21.—*Parapeneopsis stylifera*, Edw., telson × 2.

„ 22.—*Parapeneopsis sculptilis*, Heller, ♂ × $1\frac{1}{2}$.

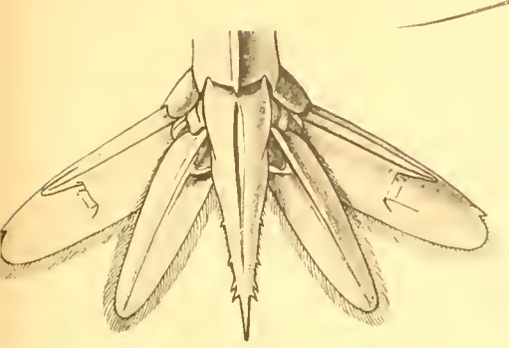
„ 22*a*. „ „ carapace of ♀ × $1\frac{1}{2}$.

„ 22*b*. „ „ abnormal rostrum of ♂ × $1\frac{1}{2}$.

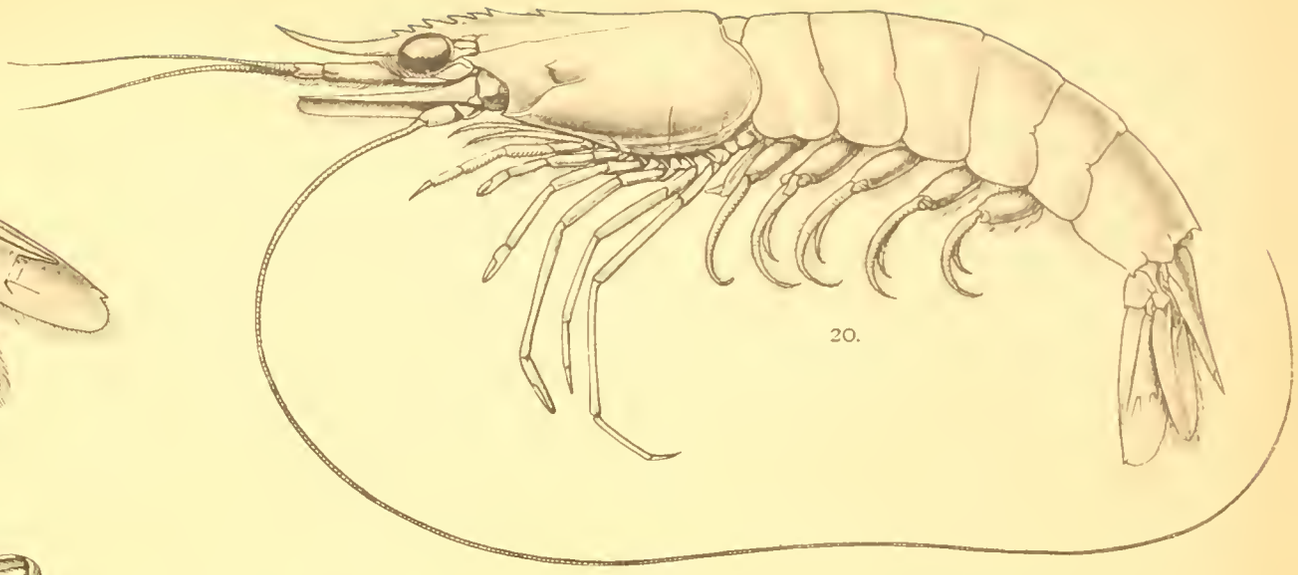
„ 22*c*. „ „ andricum × 2.

„ 22*d*. „ „ thelycum × 2.

„ 23.—*Parapeneopsis sculptilis*, var. *cultrirostris*, Alc. × 4.



21 × 2.



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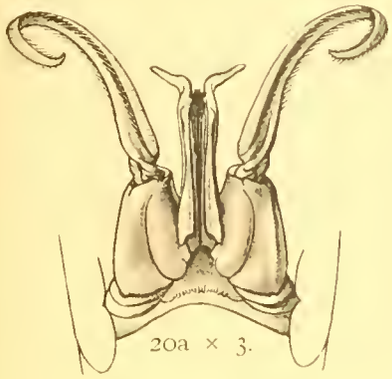
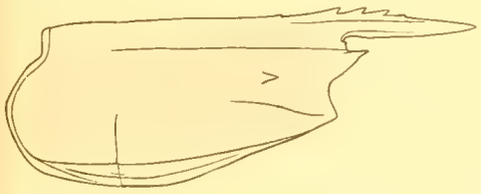


20a × 3.

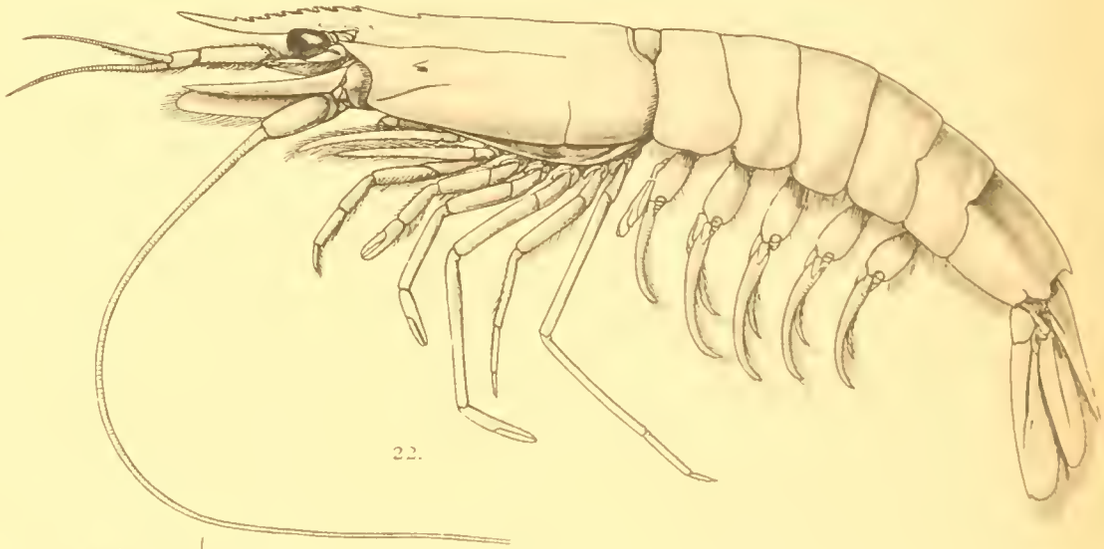
20c × 2.

20b · 1½.

22a.



22b.



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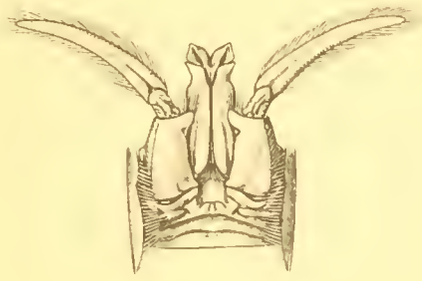


22c × 2.

22d × 2.

23 — 1

20. *Parapeneopsis stylifera var. coromandelica.* 21. *Parapeneopsis stylifera.* 22. *Parapeneopsis sculptilis.*

23. *Parapeneopsis sculptilis var. cultrirostris.*

EXPLANATION OF PLATES.

Plate VIII.

Fig. 24.—*Parapeneopsis maxillipedo*, Alcock, ♀ × $1\frac{1}{2}$.

„ 24*a*. „ „ andricum × 3.

„ 24*b*. „ „ thelycum × 2.

„ 25.—*Parapeneopsis uncta*, Alcock, ♂ × $1\frac{1}{2}$.

„ 25*a*. „ „ andricum × 2.

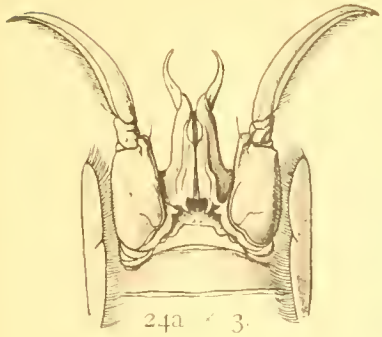
„ 26.—*Parapeneopsis nana*, Alcock, ♀ × 2.

„ 26*a*. „ „ andricum × 5.

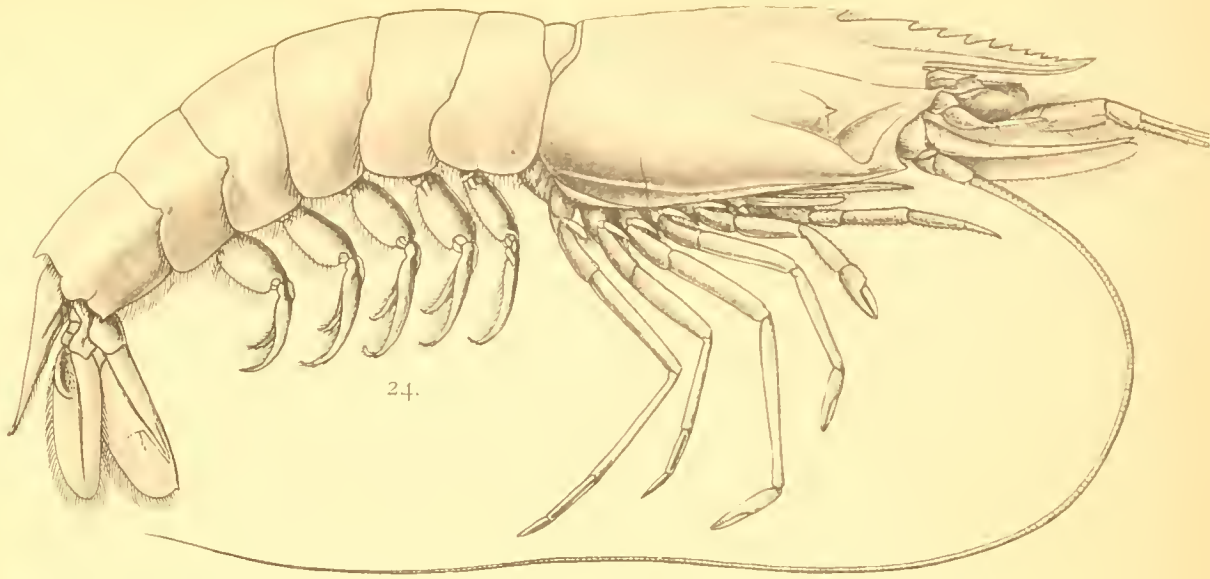
„ 26*b*. „ „ thelycum × 8.

„ 27.—*Parapeneopsis acclivirostris*, Alcock, ♀ × $2\frac{1}{2}$.

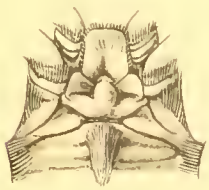
„ 27*a*. „ „ thelycum × 8.



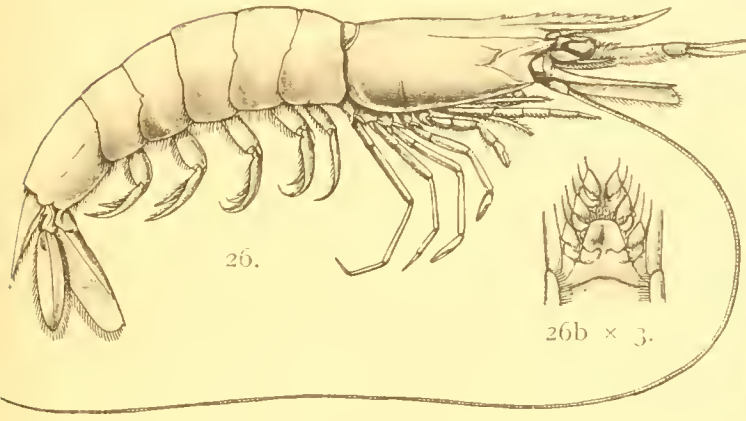
24a × 3.



24.

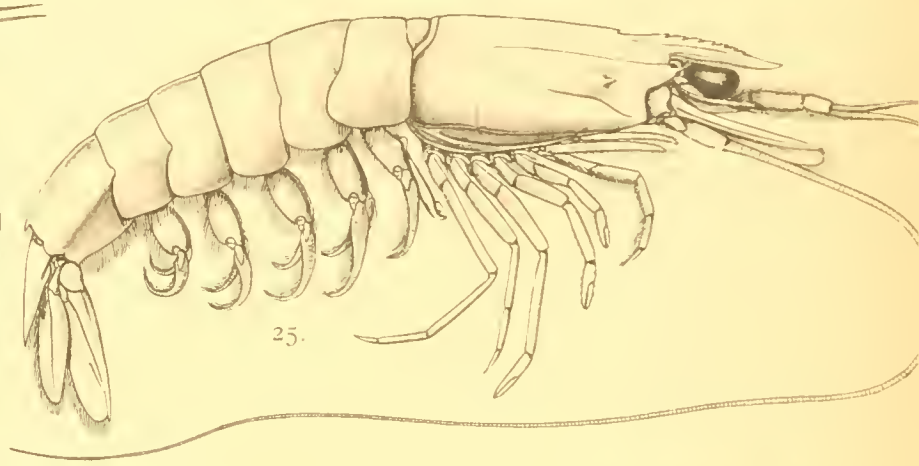


24b × 2.



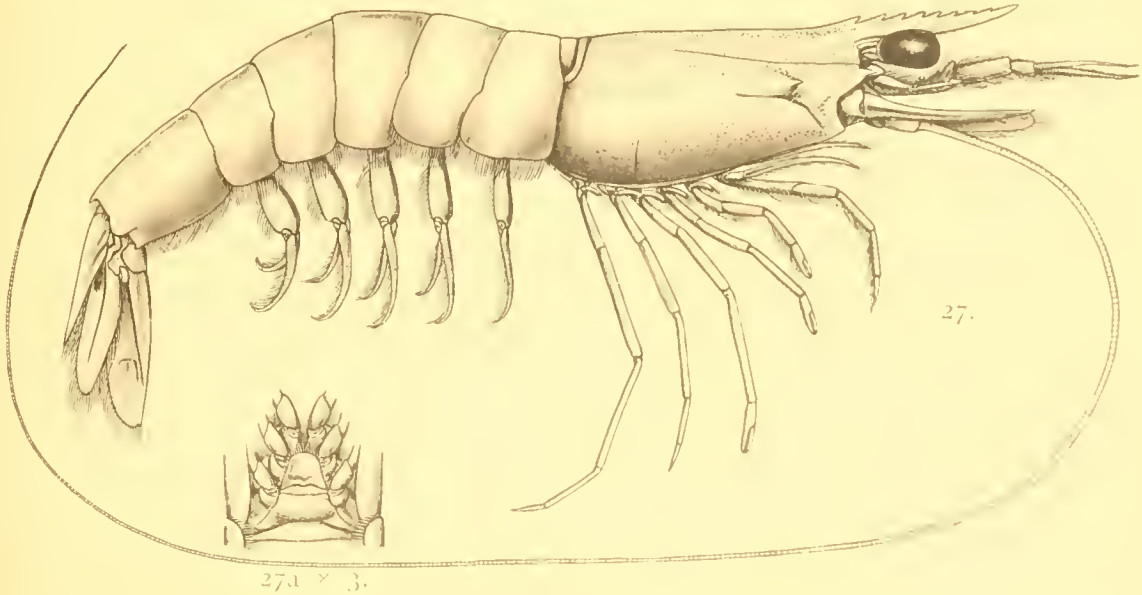
26.

26b × 3.



25.

25a × 2.



27.

27a × 3.

26b × 5.

24. *Parapenæopsis maxillipedo.* 25. *Parapenæopsis n[illegible]* 26. *Parapenæopsis nana*

27. *Parapenæopsis acclivirostris*

B[illegible] C[illegible] Dehra

EXPLANATION OF PLATES.

Plate IX.

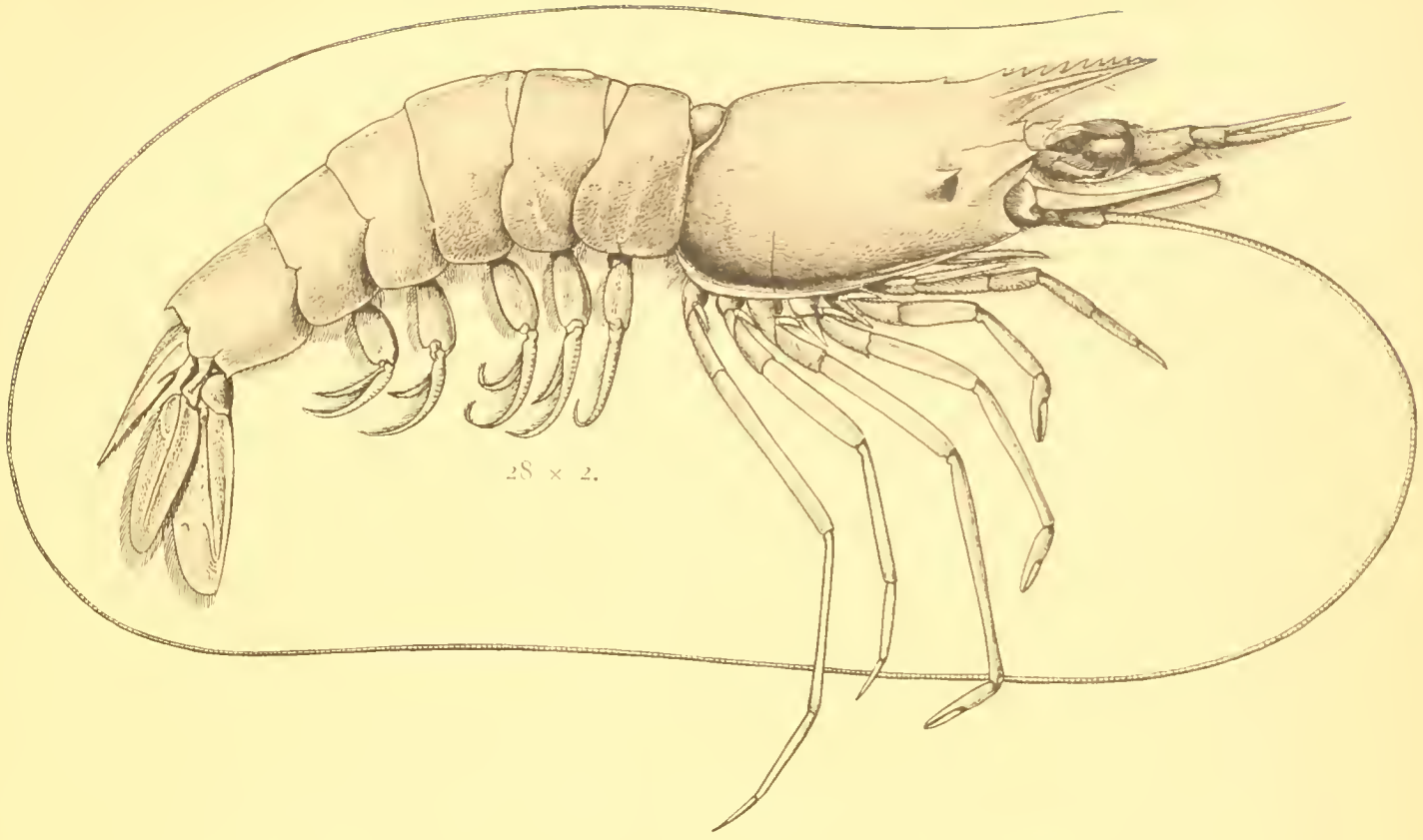
Fig. 28.—*Trachypeneus asper*, Alcock, ♀ × 2.

„ 28*a*. „ „ andricum × 4.

„ 28*b*. „ „ thelycum × 2.

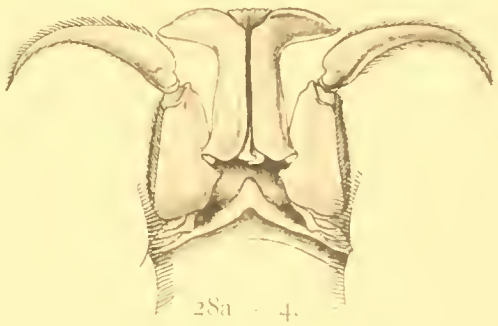
„ 29.—*Atypopeneus compressipes*, Henderson, ♂ × 3.

„ 29*a*. „ „ andricum × 3.

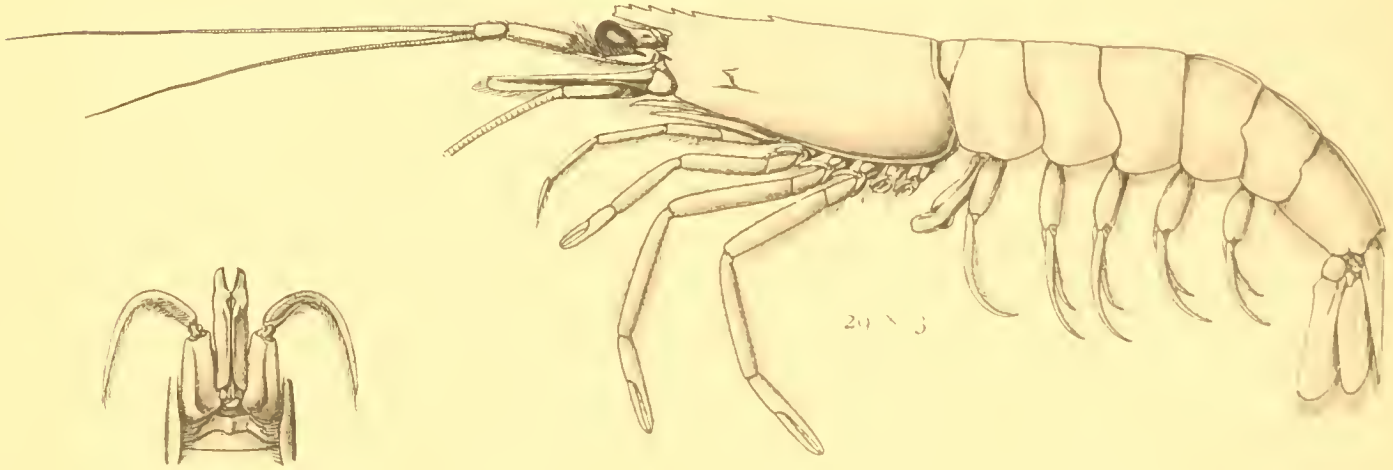


28 × 2.

28b × 2.



28a × 4.



29 × 3

29a × 3.

28. *Trachypenaeus asper.*

29. *Atypopenaeus compressipes.*

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